APR 8 1929

The

British Medical Journal

THE JOURNAL OF THE BRITISH MEDICAL ASSOCIATION.

Including an Epitome of Current Medical Literature
WITH SUPPLEMENT.

No. 3559. SATURDAY, MARCH 23, 1929. Price 1/3

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An Address
ON
THE PLACE OF SURGERY IN THE TREATMENT OF PEPTIC ULCER.*

BY

D. P. D. WILKIE, M.Ch., F.R.C.S.,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF EDINBURGH.

THE choice of this subject for my lecture requires a little explanation, if not apology. The question of the advantages of medical over surgical treatment of peptic ulceration, and vice versa, has been debated almost *ad nauseam*. My object in this paper is not so much to uphold one line of treatment against another as to review the facts regarding the etiology of chronic ulceration so far as we know them, and to formulate rational lines along which the physician and surgeon, working hand in hand, may determine in which class of case, and when, medical measures should give place to surgery.

It is no new discovery in medicine that peptic ulceration will frequently yield to rest, frequent fluid feeds, and alkalis; nor, on the other hand, is it altogether surprising that extensive gastric resections are survived and followed by comparative comfort. What the patient with peptic ulceration wants to know is, what type of treatment will in his case restore him to health in a reasonable time with a probable chance of his remaining well under something approaching ordinary dietary and working conditions.

ETIOLOGY OF ULCERATION.

Few subjects have engaged the attention of so many experimental research workers as this. It has been shown that gastric ulceration may be produced by many factors, singly or combined. Blood infection may produce multiple acute ulcers, deranged or interrupted nerve supply may lead to ulceration, retrograde venous embolism may occasionally cause ulcer. Buchner has recently shown that by a combination of starvation and the injection of histamine into rats gastric ulceration occurs regularly. As in the human subject, it occurs not in the acid-secreting part of the organ, but in the part immediately adjacent to this. Rowlands, Underhill, and Mendel, and recently Magee, Anderson, and McCallum, have shown that ulceration may appear in the stomach as one of the manifestations of deficiency disease, and Rogoff and Stewart that it may follow adrenalectomy, an operation which, as Dale has shown, produces a condition of the blood not unlike that following injection of large doses of histamine.

It has always been difficult in the experimental animal to maintain ulceration and to get the typical deep punched-out chronic ulcer found in the human subject. Further, in this particular case it is difficult to produce experimentally conditions which are quite comparable to those in the human being. We are therefore thrown back to a large extent upon our clinical and pathological observations on the human subject. We reflect on the fact that the condition is met with in relatively healthy young adult males; that its symptoms are, to begin with, strictly periodic; that hyperacidity is present in the early stages; that painful spasm, as evidenced by the relief obtained by swallowing anything, is the rule. Further, we remark that dental infection is a frequent but by no means constant accompaniment, and that in many cases there is a history of acute or chronic appendicular trouble. We find that constipation, worry, overwork, loss of sleep, excessive smoking, and irregular meals, particularly if these are of the carried or snack-counter type, all seem to precipitate or aggravate the condition, which is more common among the highly strung and nervous than among the more phlegmatic members of the community. We note that, whilst multiple acute ulcers may be widespread, the chronic variety is found in certain strictly localized sites along the lesser curvature of the stomach, especially at the point where the body of the stomach abuts on the pyloric canal, and in the first part of the duodenum, approximately half an inch beyond the pylorus, and, in the latter case, usually multiple, one on the anterior and one on the posterior wall. We have good grounds for stating that the cause of gastric and duodenal ulcers must be one and the same, as they are so frequently found together. In my own series of duodenal ulcers a coincident gastric ulcer was present in 15 per cent., and of gastric ulcers a coincident duodenal ulcer was present in over 50 per cent. of cases. That a certain degree of gastritis accompanies and probably precedes ulceration is a fact of experience. *Post-mortem* room observations show that multiple scars of healed ulcers are not uncommon, and frequently alongside an active penetrating ulcer are found the scars of other more superficial and healed ulcers.

What is the initial and primary factor in determining the ulcer? I believe that it is a blood-borne infection which settles in the lymph follicles of the stomach and duodenum, some of which soften and erupt on the surface, the devitalized tissue undergoing digestion and leaving small follicular ulcers. The infection is streptococcal in type, and the primary source is usually the teeth or tonsils, and possibly, in some cases, the appendix. My reasons for this belief are as follows: In many cases we have recovered a streptococcus in pure culture from the base of an excised ulcer. In a number of cases we have found a coincident streptococcal infection of the gall-bladder and the appendix, and, whilst we have not been able to demonstrate experimentally the same selective affinity of the streptococcus for the stomach and duodenum that we have for the gall-bladder, we have sufficient evidence to point to the probability of this being the case.

There is admittedly a great tendency for acute ulcers in the stomach and duodenum to heal. Why is it that a certain number of such ulcers develop into the chronic peptic variety, and why are they found in such definite restricted areas of the stomach and duodenum? If we examine the common ulcer sites we find two characteristic features—first, the mucosa is relatively fixed, and secondly, the blood supply is relatively precarious. The greater curvature of the stomach, which contains few lymph follicles and the mucosa of which is lax and mobile in order to accommodate itself to the changing capacity of the organ, is practically immune from ulceration. The lesser curvature, on the other hand, is rich in follicles, is comparatively a fixed part, and is capable of little expansion; a defect in its lining remains open and is, moreover, in the direct traffic route of the entering food. The first part of the duodenum is, like the stomach, part of the foregut, has a smooth, unfolded mucous membrane rich in lymph follicles, and receives the acid chyme practically undiluted.

If these facts explain to some extent the *site* of chronic ulceration, what determines chronicity? Clinically we recognize two features in ulcer cases—hyperacidity and spasm. Further, we know that factors such as worry, excessive smoking, etc., which upset the nervous system, may, and frequently do, contribute to the onset of an "attack" of ulcer symptoms. From radiological studies we learn that in the duodenal ulcer cases rapid initial emptying of the stomach occurs, and during this period the patient is free from discomfort. A small residue is left in the stomach; this is hyperacid, pyloric spasm sets in, and the patient experiences the typical gnawing pain which he can relieve to some extent by swallowing fluid or food, which will cause pyloric relaxation. The majority of duodenal ulcers are small and shallow, and if given rest and shielded from the hyperacid gastric chyme, the tendency to healing is well marked. In the case of gastric ulcer acid appears to play a less important part, indeed hypo-acidity is present in many cases of chronic ulcer; hypermotility is also less pronounced and pyloric spasm comes on earlier after taking food. The drag on the irritated lesser curvature after taking food induces painful local spasm, which handicaps the blood supply and does not favour healing. The pain is notably relieved by the recumbent attitude, which obviates or lessens the drag.

It is a notable feature in the history of ulcer cases that a country holiday will almost always dispel an attack—that is to say, fresh air, sunlight, and a change of diet have an immediate beneficial influence. In reviewing the etiology of peptic ulcer we must therefore consider,

*Delivered to the Hyde Division of the British Medical Association on January 24th, 1929; illustrated by lantern slides.

I believe, three main factors: infection, nervous influences, and a possible dietary vitamin deficiency. In this connexion Mr. Garnett Wright has suggested that the success of the modern medical treatment of ulcer depends on the correction of vitamin deficiency by the giving of raw eggs, cream, etc., to patients who were accustomed to live on tea, white bread, cakes, and tinned or cooked foods.

In the light of the facts stated above we can understand how the removal of septic foci in the mouth, rest in the recumbent position, the ensuring of adequate sleep, the cutting down or out of tobacco, the giving of small meals of fresh vitamin-rich fluid food at frequent intervals, and the supply of alkali, may together favour, indeed almost ensure, the healing of gastro-duodenal ulceration in all but old-standing and neglected cases.

The Rationale of Surgical Treatment.

Apart from emergency operations for perforated ulcer, operative treatment for peptic ulcer is a practice of not many years' duration. It may be said to have started when it was found what great relief followed a gastro-enterostomy for irremovable cancer of the pylorus. The earlier operations were all done to relieve a mechanical difficulty—that is, a stenosis resulting from the cicatrization of an ulcer in the duodenum or stomach. The brilliant results of such operations induced surgeons to try the same short-circuiting operation in cases of ulcer without stenosis in order to give rest to the ulcerated part. It was further found that the short-circuit permitted the entry of a certain amount of bile, mixed with pancreatic and duodenal secretion, into the stomach, and thus reduced acidity. This, the so-called physiological action of the stoma, was held by many, notably Paterson, to be the most beneficent effect of the operation. The results of gastro-enterostomy for chronic duodenal ulcer with some degree of mechanical difficulty from stenosis—that is, with a somewhat dilated stomach—were almost uniformly good. In a few regurgitant vomiting from a badly placed stoma resulted, and in a small percentage (less than 3 per cent.) a peptic ulcer developed at the stoma.

In another group, however, in which an irritable ulcer without stenosis but with marked hyperacidity and pronounced gastric hypermotility was present, the results of the short-circuiting operation were by no means so favourable. Here the danger of jejunal ulcer is a very real one, and only the most careful and prolonged after-treatment will prevent it. The consequence has been that an injudicious selection of cases for the operation, resulting in the development of jejunal ulceration in an unpleasantly large group of individuals, has prejudiced the good name of one of the most beneficent of surgical procedures.

The case of gastric ulcer is altogether different. After a few years of trial gastro-enterostomy was found to be most uncertain in its results in the treatment of gastric ulcer. Almost 50 per cent. of patients continued to have symptoms, and in a few cases malignant disease supervened on the simple ulcer which had not healed. As with duodenal ulcer, so with the smaller non-penetrating gastric ulcers, healing will result in a large proportion of cases under systematic medical treatment. When the ulcer is large and penetrating, however, even prolonged medical treatment will fail in many instances to cure, and during this long and tedious course of treatment malignant disease may have supervened and spread to the regional lymph glands or beyond them. The rule of the Mayo Clinic, that all penetrating gastric ulcers of 1 cm. or more in diameter must be regarded as potentially malignant and should be removed, is one that I would have our ultra-conservative and optimistic medical friends take to heart.

Size, penetration, and tendency to stenosis and hour-glass constriction should, in my opinion, be the indications for surgical intervention.

The Bleeding Ulcer.

After a patient has had one or more severe haemorrhages the question of surgical intervention usually arises. The problem presents itself first as to the risk run by persevering with purely medical measures, and, secondly, as to the immediate risk of operation and the possibility of dealing with the bleeding ulcer in such a way as to give a reasonable hope of lasting cure. To maintain that a patient never dies of haemorrhage from an ulcer is to go contrary to facts. Any pathologist of experience can cite very many cases where haemorrhage from an ulcer was the immediate cause of death. The operation for haemorrhage during the acute and threatening stage is, however, not only a dangerous, but in my experience an unsatisfactory, one. More often than not the haemorrhage has stopped at the time of operation, no definite bleeding point can be dealt with, and the patient, even if transfused, is not in a fit condition to allow of the radical treatment which would appear to be the only rational means of ensuring against recurrence. I believe it is wiser to tide the patient over the immediate effects of the haemorrhage, taking the risk of another, possibly fatal, bleeding, and to operate not earlier than ten days after the last severe bleeding. If no radiographic examination has been made prior to the bleeding it is usually wiser to wait until this can be done, for if it shows no gross deformity, either in stomach or duodenum, it is questionable if any operation should be performed.

For the bleeding duodenal ulcer a short-circuiting operation may be successful, but in my experience it fails in about 40 per cent. of cases to prevent recurrence of bleeding sooner or later. The persistently bleeding duodenal ulcer is usually on the posterior wall, is penetrating, and shows little tendency to heal after a short-circuiting operation. It is in this class of case that a partial duodenectomy is, to my mind, indicated, and I would reserve this operation for this type of ulcer. If the patient's general condition or the technical difficulties make such radical treatment undesirable a temporary closure of the pylorus and a gastro-enterostomy may be carried out.

For the bleeding gastric ulcer local excision with a short-circuit or a partial gastrectomy is required. In both cases the suitable operation is no minor one, and should not be attempted until the patient's condition is such as to make the immediate risk little if at all greater than that of any major gastric operation.

Conservative Medicine versus Radical Surgery.

In this country at the present time there is unquestionably a strong trend in favour of prolonged medical treatment of peptic ulcers, no matter at what stage or of what size the ulcers may be. The writings of MacLean and Hurst have done much to stimulate a renewed interest and zeal in the purely medical lines of treatment. This swing of the pendulum was perhaps inevitable after a period in which operative treatment was resorted to without much nicety of discrimination and selection of cases, with its inevitable aftermath of unsatisfactory results. On the Continent, on the other hand, the tendency has been in the direction of ever more radical surgery. It has gone so far that in some clinics a total extirpation of the "ulcer-bearing area" is the standard treatment for duodenal as well as for gastric ulcer. Some surgeons, with a naive disregard for the facts of physiology, remove what they term the acid-secreting part of the stomach with the object of avoiding a jejunal ulcer. As Buchner has so clearly pointed out, ulcers are found not in the acid-secreting parts, but in those which, whilst not secreting acid, are exposed to acid content.

The Argument.

If we examine the basis of the argument of the ultra-conservative school against operative treatment we find that it rests on their experience with the surgical derelicts—the few with regurgitant vomiting, and the rather larger number with jejunal ulcer. Also we find that they have a very natural aversion to the sacrifice of a large part of a most useful and highly specialized organ because of the presence on its wall of a small infective ulcer. Further, they state that, given time and care, even the largest gastric ulcers will heal under medical treatment.

On the other side their more surgically minded brethren point to the large number of the populace who suffer from chronic ulcer and who cannot or will not carry out the prolonged medical treatment and still more prolonged dietetic regime which some physicians advocate so strongly.

Further, they emphasize the real danger of overlooking early malignant disease if chronic penetrating gastric ulcers are to be subjected for an indefinite period to persistent and unrelenting medical measures.

THE VIA MEDIA.

In this, as in so many fields in which strong and opposing views prevail, the truth will probably be found somewhere between the extremes. I suggest the following as the rational lines to follow in dealing with ulcer cases.

A. For all acute ulcers, for those which have not caused more than six recurrent attacks of symptoms, for those which give rise to no gross deformity in the radiogram and show no signs of true penetration, for those which have not given rise to more than one serious haemorrhage, and for those in highly nervous subjects, medical treatment should be given a fair and prolonged trial.

B. For all chronic ulcers causing gross deformity and organic stenosis, for all cases where more than six attacks have occurred, where strict dietetic regime is impossible, where there is definite *x*-ray evidence of serious organic deformity, for all the penetrating gastric ulcers, and particularly for those in which the *x*-ray photograph discloses a crater judged to be 1 cm. or more in diameter, surgery is demanded and medical treatment unjustifiable. For all ulcers which have bled freely on three or more occasions surgery must be considered.

THE CONSERVATIVE SURGERY OF ULCER.

How may we give the unquestionable benefits of surgery to the groups of cases indicated above, and at the same time avoid the unpleasant, and indeed dangerous, complications of regurgitant vomiting and jejunal ulcer, whilst conserving as much normal tissue as we can? For the duodenal ulcer with marked stenosis a posterior gastro-enterostomy, placed not too far to the left and with a roomy aperture in the mesocolon, cannot be improved on; the results are consistently good.

Perhaps the most impressive review of the results of the conservative surgery of duodenal ulcer is that given by Balfour, who followed up the cases of *one hundred medical men* operated on in the Mayo Clinic for duodenal ulcer. The average time since operation was eight and a half years. A gastro-enterostomy had been done in 92 per cent. of the cases, excision in 6 per cent., and gastro-duodenostomy in 2 per cent. In 90 per cent. the result of the operation was complete relief from symptoms, and in the great majority the reports were almost extravagant in their praise of the effects of the operation.

For the persistently recurring duodenal ulcer without much stenosis or gastric dilatation—the type which we feel should be cured by medical measures, as it often is for a short time—in the man who cannot take any liberties without suffering and will not lead "the life of a weaned child," for this type a gastro-enterostomy always carries with it a potential jejunal ulcer, and a gastro-duodenostomy is undoubtedly the operation of choice.

GASTRO-DUODENOSTOMY FOR DUODENAL ULCER.

In the last few years I have gradually substituted this operation for posterior gastro-enterostomy in all cases without very definite stenosis. At first I practised it mainly in female patients with a lax, readily mobilized duodenum, but latterly I have found that it can be done almost as easily and with equal advantage in the male. The rationale of the operation is that it excludes from the food stream the ulcer-bearing area of the duodenum; that the new opening is in the pyloric end of the stomach, the peristalsis of which is not interfered with; that the acid gastric contents are discharged into the second part of the duodenum directly opposite the point of entry of the bile and pancreatic juice; that the rest of the small intestines need not be disturbed, and incidental complications from adhesions, etc., are thus minimized; that the ulcer or ulcers are left untouched, a direct attack upon the average duodenal ulcer being, in my opinion, quite unnecessary.

The essentials for the operation are complete and effective mobilization of the second and the commencement of the third parts of the duodenum. To obtain this the hepatic flexure of the colon must be freed, the peritoneum on the outer side of the second part of the duodenum incised, the fascial bands, which hold down the second and especially the third parts of the duodenum, divided, and the duodenum brought to the surface. Morison's pouch is then packed off, and the anastomosis carried out with two layers of No. 00 catgut sutures. It is better to do the operation without clamps, as the less the duodenum is traumatized the better. In this operation the pylorus and first part of the duodenum are folded the one on the other, making an effective barrier to the passage of food through the pylorus. In the few cases where satisfactory mobilization of the duodenum has been impossible a Finney's operation has been performed with almost equally good results.

It may be urged against this operation that the post-operative course is frequently not so smooth as that of a posterior gastro-enterostomy. Against this, however, may be claimed the infinitely smaller risk of a peptic stomal ulcer. I have not encountered any, and I have only heard of two. The operation disturbs the normal physiology less than does a gastro-jejunostomy, and the possibilities of late complications are infinitely less. When the stomach is grossly dilated or markedly ptosed it does not give the effective drainage obtained by a gastro-jejunostomy, and in one case where drainage was unsatisfactory I had subsequently to perform the latter operation, which gave complete relief.

SURGICAL TREATMENT OF GASTRIC ULCER.

When an ulcer has actually penetrated the muscular coats of the stomach and is adherent to the pancreas, and especially when it is associated with one or more duodenal ulcers—which it is in over 50 per cent. of cases in my series—the chances of sound healing and lasting cure by medical measures are exceedingly small. Without in any way wishing to labour the question of malignant degeneration of simple gastric ulcer, and while considering that it is a relatively rare complication, I believe that it occurs sufficiently often to make long-continued medical treatment unjustifiable. It is well-nigh impossible to obtain reliable figures on the question. Two cases, however, where the course from simple ulceration to malignancy was observed, impressed me with the danger. In one case a man over 50 years of age had been under medical treatment for over eight years for what was diagnosed as duodenal ulcer. He came to operation on account of jaundice associated with a palpable swelling below the right costal margin—taken to be the gall-bladder. I found a healed duodenal ulcer and a large gastric ulcer, not palpably malignant, but associated with a large secondary malignant nodule in the liver. The edges of the ulcer were found to be infiltrated by malignant disease.

The second case was in a woman of 28 who, two years previously, had had a gastro-enterostomy performed for what appeared to be a simple peptic ulcer of the lesser curvature. When I saw her, two years after her operation, she had a palpable mass in the epigastrium. This proved to be a malignant mass on the lesser curvature spreading from the edges of a penetrating ulcer.

I believe that large gastric ulcers should be excised. Whether the operation be a partial gastrectomy or a free local excision with a gastro-enterostomy, a gastro-duodenostomy or a Finney's operation is, I think, a minor technical matter. Personally I prefer to do a local excision with a gastro-duodenostomy. This ensures free drainage from the stomach, and excludes the duodenal ulcer which is so often present as well, whilst conserving normal tissue and maintaining an attitude of respect for what, after all, cannot but be a useful organ.

The Cautery Method.—When an ulcer is found high on the lesser curvature and of no great size, the destruction of the base and floor of the ulcer by means of the thermo-cautery along with a short-circuiting operation, as introduced by Balfour, is a method which in my hands has given very good results. For larger ulcers—that is, for those in which surgical treatment is most clearly indicated—excision is, I believe, undoubtedly preferable.

Cholecysto-gastrostomy.—The bilification of the stomach by anastomosing the gall-bladder to that organ, advocated and practised in this country by Braithwaite, is based on

the conception that the neutralization of the acid gastric juice by the regurgitant fluid through a gastro-enterostomy is due mainly, if not entirely, to the bile contained in that fluid. Whilst good results have been reported in cases of gastric ulcer so highly situated in the lesser curvature as to preclude excision, and in a number of cases of doubtful pathology with hyperacidity as their dominant symptom, the basis of the method is insecure, as bile in itself is not alkaline, and after a gastro-intestinal anastomosis it is the duodenal and pancreatic secretions rather than the bile which give the regurgitant fluid its neutralizing properties. I have carried out this operation in only two ulcer cases, one of very high lesser curvature ulcer and one of gastro-jejunal ulcer. In both cases some immediate improvement resulted, but the symptoms of acidity and pain returned.

Ulcer as One of Many Septic Foci.

No treatment of ulcer can bear the promise of lasting cure if it does not take cognizance of the other foci of infection which accompany it. The prevalence of dental infection is to my mind the most important single factor in determining the frequency of peptic ulcer. It is indeed surprising to find in the vast majority of the patients sent for surgical operation after ineffective medical treatment that gross dental infection has been left untreated. In many of these cases we recover from the pyorrhoeal pockets the same streptococcus as we find in the ulcer. Efficient dental treatment must, therefore, be a first consideration, no matter what other lines of therapy we may follow.

It is within the abdomen, however, that we so frequently find other infective foci which must be dealt with at the same time as the ulcer. The combination of an ulcer in the stomach or duodenum or both with infection in both gall-bladder and appendix is quite common. All three lesions must be dealt with if complete and lasting relief is to be obtained. The following brief note of a case will illustrate the significance of a thorough eradication of foci.

Mr. A. B., aged 57, had thirteen years previously had a gastro-enterostomy performed for duodenal ulcer. He obtained some temporary relief, but his old pain soon returned; he suffered from nausea, flatulence, and constant abdominal discomfort, and led the life of a chronic dyspeptic. On examination we found him emaciated, with a dilated stomach and tenderness over three points in the abdomen—just to the left of the umbilicus, just below the right costal margin, and in the right iliac fossa. *X*-ray examination showed his stomach to be dilated, the stoma stenosed and irregular, evidently from a jejunal ulcer. At operation a jejunal ulcer was found and excised and his stoma enlarged. His gall-bladder was thickened and inflamed, as was his appendix; both were removed. Regional lymph glands were taken from all three sites and from all the *Streptococcus viridans* was grown in pure culture. On injection into rabbits both cholecystitis and duodenal ulcer were produced. Since the second operation the patient has enjoyed perfect health and lost all his dyspeptic symptoms.

It may be that we shall eventually succeed by suitable inoculation in immunizing patients against these multiple streptococcal abdominal lesions, or, still better, by timely dental treatment and better dietary and hygienic treatment, in preventing them. Till then, however, surgery must continue to play a part in dealing with the full-blown lesions, and surgery, whilst conserving healthy tissue, must deal thoroughly and radically with the different foci.

An Address
ON
RADIUM AND ITS SURGICAL APPLICATIONS.

GIVEN BEFORE THE BRISTOL MEDICO-CHIRURGICAL SOCIETY
BY
H. S. SOUTTAR, M.D., M.Ch., F.R.C.S.,
SURGEON, LONDON HOSPITAL.

RADIUM was discovered by Madame Curie in 1898, and its discovery marks an epoch in the history of science. It destroyed at one blow the conception of the atom as an indestructible unit, upon which the whole of chemistry and the greater part of physics had been built, and it opened up a field of investigation which has provided work for physicists for the last thirty years, and has led to discoveries which have revolutionized all our ideas of the physical universe.

Soon after the element had been isolated Becquerel, by inadvertently carrying radium in his pocket, discovered its destructive action on the human tissues, but although attempts were made to turn this to surgical advantage, it was only in isolated cases and in special regions that effective results were obtained. Whilst fully recognizing the value of the work done with radium in diseases of the skin and in carcinoma of the cervix, one must admit that only lately have the surgical possibilities of radium been appreciated, or any attempt been made to exploit its powers. Indeed, those who have had the opportunity of studying the subject must feel that we are only at the beginning of what may prove to be a new epoch in the treatment of malignant disease. For the first time in the history of medical science we hold in our hands a power which beyond any question can cure cancer in many of its forms, and which can destroy a malignant growth without its surgical removal, and it is our business to explore its possibilities to their utmost limits.

This is a subject which none of us can afford to neglect, and it is essential that every surgeon should realize what can be done with radium and understand the methods by which it is applied. To use it effectively he must know something of the physical properties of the new weapon which has been placed in his hands, and I therefore make no apology in describing briefly those physical properties which are fundamental in the action of radium when it is used by the surgeon.

The revolutionary conception involved in the discovery of radium was the idea that an element could decay, and in the process of decay be transformed into an entirely different substance. It has been established, however, beyond any possible question that certain elements possess this power, and they can indeed be arranged in a number of definite series in which each element is the product of the last. The most important of these is the uranium series in which radium occurs, and you will see the parentage and descendants of radium set out in the family tree shown in Table I. Not only do we know its family history, but we know the expectation of life of each of its members, as represented by its half-value period, the time in which one-half of the element has disappeared, and you will see that this varies considerably, since while uranium 1 attains the patriarchal age of five thousand million years, radium itself is half gone in 1,750 years, and radium A in three minutes. It is indeed to this rapid decay of radon and the other elements in the centre of the table that we owe the surgical possibilities of radium. There is something which stirs me profoundly in this dry table. The

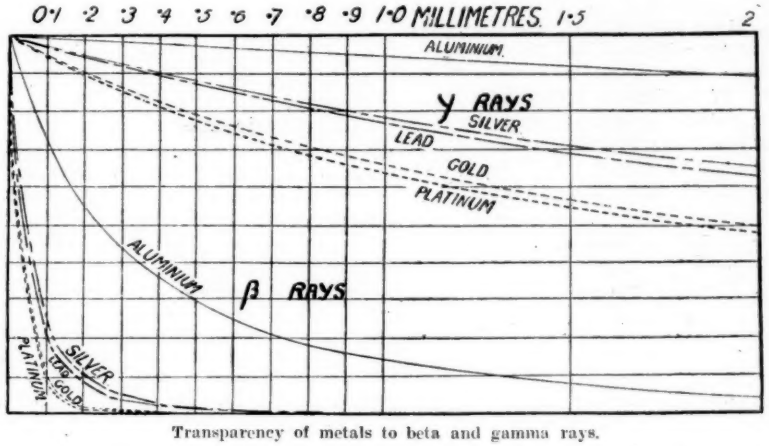
TABLE I.—*The Uranium Series.*

Element.	Atomic Weight.	Radiation.	Half-value Period.
Uranium 1	238	$\alpha\,\beta\beta$	5,000,000,000 years.
Uranium 2	234	α	2,000,000 years.
Ionium	230	α	140,000 years.
Radium	226	$\alpha\,(\beta)$	1,750 years.
Radon	222	α	3.85 days.
Radium A	218	α	3 minutes.
Radium B	214	$\beta\,(\gamma)$	26.7 minutes.
Radium C	214	$\alpha\,\beta\,\gamma$	19.5 minutes.
Radium D	210	β	17 years.
Radium E	210	β	5 days.
Polonium	210	α	136 days.
Lead	206	—	—

evolution of uranium occupies a period of five thousand million years, and it began perhaps when our world was a glowing nebula. For a few days only it exists as radon; for those few days perhaps—we are not yet quite certain—it offers to us the cure of cancer.

We have spoken of "decay," but in order to understand the real meaning of the term and its importance for our subject we must first say something of the modern view of the structure of the atom. We owe to Rutherford the conception of the atom as a minute solar system, in which the nucleus is the sun, whilst the electrons flying round it with inconceivable velocity are the planets. In very general terms radio-activity and mass are properties of the nucleus, whilst chemical affinities and spectroscopic properties are manifestations of the flying electrons. The electrons are all identical, each carrying the same negative charge; the nuclei are all different, but they are built up of the same units, electrons carrying a negative charge, and protons which each carry an exactly equal positive charge.

The simplest atom of all is the hydrogen atom, consisting of a single proton as nucleus, with a single electron flying round it. Next in order comes the helium atom, its nucleus built up of four protons and two electrons welded together, whilst its planetary system consists of two electrons whirling round the nucleus. To us its importance can scarcely be exaggerated, for the nucleus is identical with the alpha particle, so that an alpha particle may be regarded as a helium atom deprived of its two planetary electrons, whilst it does not require much imagination to see that it must carry a positive charge exactly double the negative charge carried by each electron. When we point out that the electron, set free to fly through space, is the beta particle, and that with its liberation is bound up the production of gamma rays, it will be realized that the helium atom carries in miniature the whole physical basis of our subject.



Transparency of metals to beta and gamma rays.

Contrasted with these simple structures the radium atom presents an enormous complexity. Its nucleus is a dense cluster of 226 protons and 138 electrons, some at least of which are grouped together to form alpha particles, whilst around this nucleus whirl no fewer than 88 electrons. The formation is unstable and alpha particles are being constantly discharged from the nucleus, beta particles from the nucleus and from the planetary system. As each particle is projected into space the characters of the atom are changed. It is no longer radium, but one of its derivatives, and this is the physical interpretation of "decay." Radium becomes radon; radon becomes radium "A," which is so unstable that within a few minutes it has lost an alpha particle and become radium "B." Finally stability is reached in an atom indistinguishable from that of lead, and so far as we know no further change occurs.

If nothing further were said a very false impression might be gained of atomic structure, for I have said nothing at all about the size of the atom as a whole, or the relative sizes of its parts. The atom is so minute that to form any real impression of its size we must take an entirely new unit for our measurements; the most convenient is the Angström unit, one hundred millionth of a centimetre, often denoted by the symbol A.U. On this scale the wave-length of green light, in the middle of the visible spectrum, is 5,000 A.U.; the wave-length of x rays ranges between 12 A.U. for the soft rays and 0.5 A.U. for the hard rays; and the wave-length of the softest gamma rays is 1 A.U., whilst the hard gamma rays may be as short as 0.04 A.U.

On this scale the diameter of the hydrogen atom is almost exactly 1 A.U., but this is the diameter of the orbit of the electron as it whirls through space around the nucleus. The diameters of the nucleus and electron are far smaller, each being about 1/25,000 A.U. You may, indeed, represent the hydrogen atom by one golf ball travelling around another in an orbit about a mile across. On the same scale the diameter of a single tissue cell would be about 100,000 miles. When we talk about the impact of beta particles on the tissues it is well to bear these facts in mind. Even the most enthusiastic golfer will see something remarkable in the destruction, by quite a large number of golf balls, of an object relatively fifty times the diameter of the moon. And when, as will appear later, he sees that the destruction may equally well be produced not by the golf balls themselves but by the ether waves—gamma rays—which accompany their discharge, he will probably require the next letter of the Greek alphabet to express his feelings.

TABLE II.—*Dimensions of Waves and Atoms.*

Angström Unit (A.U.)	1/10,000,000 millimetre.
Wave length of green light	5,000 A.U.
„ of x rays	12 A.U. to 0.5 A.U.
„ of gamma rays...	1 A.U. to 0·04 A.U.
Diameter of hydrogen atom...	1 A.U.
„ of nucleus	1/25,000 A.U.
„ electron (β particle)	1/25,000 A.U.

We are now at last in a position to understand the property of radium which gives to it for us its peculiar value, the radiation which accompanies decay. As we have seen, it takes three forms, the alpha, beta, and gamma rays, and we may now sum up briefly the very different characteristics of these three forms.

The alpha rays consist of particles identical with the nucleus of helium, each carrying a positive charge of electricity, and they are projected from the nucleus with a velocity of 10,000 miles a second. In spite of this terrific velocity they have little power of penetration and are stopped by a thin sheet of paper. Even in air they rarely travel further than a couple of inches, so that although they carry the great bulk of the energy produced by the dissolution of radium they are of no practical value in surgery.

The beta rays are formed by electrons, of very small mass, carrying a unit negative charge of electricity, and projected with any velocity up to 180,000 miles a second, falling just short of the velocity of light. The soft rays of low velocity are easily stopped by a thin sheet of aluminium, but the hard rays of high velocity can pass through 0.2 mm. of silver. All but a small percentage of beta rays are, however, stopped by 0.3 mm. of platinum or by a centimetre of the body tissues. Their surgical action is therefore very local, and it is often better to avoid it altogether by the use of screens.

The gamma rays are ether waves of exceedingly short wave-length, less than 1/5,000 of that of light. They are set up apparently by the discharge of the beta particles, they travel with the velocity of light, and their power of penetration is so great that they are scarcely affected by the screens which almost abolish beta rays; they can pass through several inches of lead, and they are only reduced by about 50 per cent. in passing through four inches of the body tissues.

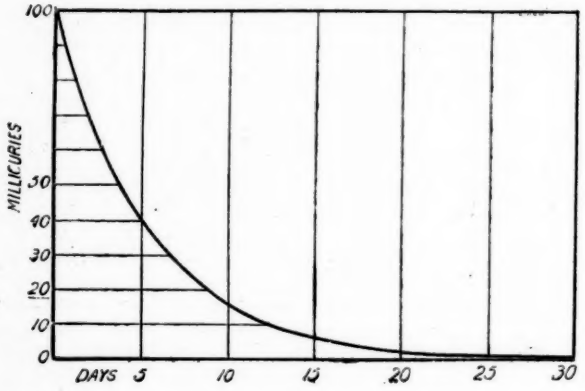
It is thus upon the beta and the gamma rays that the surgical action of radium depends. The former are destructive in their effect, and they are chiefly used in surface applicators for the production of superficial scarring. The gamma rays, on the other hand, have two very remarkable effects: they stimulate the activity of the tissue cells, and especially the production of fibroblasts, and they have a definite selective action on tumour cells, probably, at the moment of their division, causing them to disintegrate and disappear. Their total effect when they can be suitably applied is to cause the disappearance of a malignant tumour and its replacement by a scar.

I must say one word more about the process of decay. The decay of radium is so slow that where we use the element itself we may regard it as a constant source of radiation. It produces radon at a constant rate, and this by its decay produces its still less stable products with mathematical uniformity. In many instances, however, it is more convenient to use radon rather than the element itself, and the whole situation is then entirely changed. Let us consider for a moment the properties of this extraordinary substance, still more remarkable than the radium from which it springs.

Radon, the emanation of radium, is the very spirit through which it exercises its powers. It is a heavy inert gas with no known chemical affinities, and it decays with such rapidity that in 3.85 days one-half of it has vanished, whilst at the end of nine days only a fifth remains. So long as it remains in contact with radium the decay is made up by production, so that after a certain time equilibrium is established. If radium is left undisturbed this is reached in about a month, and thereafter production and decay exactly balance. At this stage radium has reached its maximum radio-active power, and the radio-active power of a milligram of element is defined as a millicurie.

TABLE III.—*Decay of Radium Emanation.*

Days.	Millicuries.	Days.	Millicuries.
0	100	12	11.5
1	83.5	14	8.0
2	69.8	16	5.6
3	58.3	18	3.9
4	48.7	20	2.7
5	40.7	22	1.9
6	34.0	24	1.3
7	28.4	26	0.93
8	23.7	28	0.65
9	19.8	30	0.45
10	16.5		



And now we meet with the most extraordinary fact of all. This gas radon can be separated from the parent radium and packed in containers, carrying with it what, for all practical purposes, is the entire radio-active power of the radium, which is left behind for the time being entirely inert. The total volume of the gas is only a minute fraction of that of the radium from which it arose, and if you purchase one gram of radium at a cost of £12,000, wait patiently for a month, and then with the most delicate precautions pump off the emanation, you will be rewarded with 0.6 of a cubic *millimetre* of evanescent gas. But that minute bubble might cure fifty cases of cancer before it itself expires.

You will see at once the extraordinary convenience of using the emanation instead of the element. It carries all the powers of its parent for a few days, and then these simply vanish; its bulk is infinitesimal; its monetary value is *nil*. It can be inserted into a growth and simply left to decay, and the patient can be sent home without risk to himself or to the radium capital of the hospital. It is essentially a method of curing out of income.

At any one moment the action of radon is precisely the same as that of a certain amount of radium, but there is this essential difference: that the amount is always diminishing. The effect of this will be clear from the chart, where it will be seen that in 3.85 days the value is down to one-half, in nine days to one-fifth. This can, however, be neutralized by starting with a larger dose, and it is a useful practical rule that the total radiation of 1.5 millicuries of emanation is physically almost the same as that from 1 milligram of element in a period of eight days.

APPARATUS AND MODES OF APPLICATION.

We must now turn to the apparatus used in the application of radium and to the methods by which it is applied. The apparatus itself is of the simplest description, and consists chiefly of needles containing radium element and seeds containing radon gas. Flat applicators are also used in the treatment of skin conditions, but these concern the dermatologist rather than the surgeon.

Needles are small platinum tubes varying in diameter from 1.5 to 3 mm., with a point tipped with iridium, and an eye through which a stout silk thread can be passed. A small cavity occupies the whole of the needle except the eye and the point, and this is packed with insoluble radium sulphate, the utmost care being taken to secure absolute uniformity in packing. The wall of the needle should be not less than 0.5 mm. in thickness, so as to cut off the whole of the beta rays. The length of the needle will vary with the requirements of the case. At the London Hospital our needles are 2, 3, 4, and 6 cm. in length, and we have the convenient arrangement that each needle contains one milligram of radium per centimetre of length.

Seeds are minute capsules containing radon gas. Usually the gas is sealed up into a tiny glass capillary, which is then inserted into a tube of platinum, gold, or silver, to cut off the beta radiation. Theoretically platinum is the most efficient screen, but personally I have found silver screens entirely satisfactory. Silver presents the advantages that it is cheap and easily worked, and I have recently elaborated a plan by which the radon is drawn directly into a long silver tube, which is then cut up into suitable lengths. The method of cutting ensures an absolute seal, and the saving of time and trouble, and of personal risk to the laboratory assistant, is considerable.

These needles and seeds provide small sources of gamma radiation, which may be either introduced into the tissues or fitted into external applicators.

Introduction into the tissues is controlled by the empirical observation that the gamma radiation from a milligram of radium can in a period of about five days destroy the cancer cells in a cubic centimetre of tissue. The total amount of radium required in milligrams is thus the volume in cubic centimetres of the tissue to be irradiated, although in the case of large growths, from the effect of cross radiation, a smaller amount will suffice. It must be distributed evenly, the needles or seeds being placed about two centimetres apart, and it must be placed chiefly in the growing edge of the tumour. The needles are attached to stout silk threads, since they contain radium element, and their loss would be disastrous. The seeds may be attached to fine silk threads and be removed later, or they may be simply inserted and left in the tissues, where in most circumstances they do no harm. The insertion of seeds is less likely to be followed by the slight sepsis which sometimes follows the insertion of needles, whilst they have the great advantage that the patient can go home. The action of the needles is, however, uniform, and not diminishing, and on this account they are preferred by some surgeons.

The treatment of a case of carcinoma of the breast furnishes an excellent example of the introduction of radium needles. We may describe the arrangement worked out by Mr. Keynes at St. Bartholomew's Hospital, which has given brilliant results. Two groups of needles are inserted into and beneath the tumour itself on different

planes; two rows of needles follow the lymphatics along the borders of the two pectoral muscles; a third group occupies the axilla; a fourth is inserted beneath the clavicle in the region of the costo-coracoid membrane; a fifth is placed above the clavicle; and a sixth group is inserted one in each of the upper five intercostal spaces and one in the rectus sheath. The actual number of the needles will vary between forty and fifty with the dimensions of the breast and of the tumour, and the total amount of radium between 75 and 100 milligrams. The needles are left in place for from seven to nine days and are then removed.

The tongue is an ideal site for the use of seeds. About eight or twelve are required, each containing from 1 to 2 millicuries of radon gas, and they are inserted into the base of the growth, usually through the tongue itself. In this way the actual growing edge is subjected to an intense cross-fire radiation, whilst, as access is obtained directly through the soft tissues of the tongue, the treatment of growths far back, in situations quite inaccessible to ordinary surgery, is perfectly simple. In most cases the tumour will disappear by magic and three weeks later it will have been replaced by a contracting scar. The glands on both sides of the neck are now dissected out in the most thorough manner, and three weeks later the treatment is completed by the external application of radium needles mounted on a thick wax collar made of Columbia paste.

For the irradiation of tumours or of glandular deposits by external application, it is essential that the radium should be supported at some distance from the skin, as otherwise certain areas of the skin will receive a dose which they cannot tolerate and will break down. A convenient plan is to mould a sheet of Columbia paste, a mixture of beeswax 100, paraffin wax 100, and pine sawdust 200, to the region. The wax should be 1.5 centimetres thick, and on its outer surface radium needles should be planted, screened in the ordinary way with 0.5 mm. of platinum. Small needles containing from 0.5 to 1.5 mg. of radium should be distributed at a distance of 1 cm. apart over the surface, whilst special regions, such as the eye or nose, can be protected by the introduction of thin lead plates into the wax mould. The whole appliance should be covered with a thin sheet of lead for the protection of the nursing staff. Even more convenient than wax in many cases is a sheet of spongy rubber; it has the great advantages of lightness and adaptability, and the needles are easily attached to it by strapping. The period of application varies with the strength of the needles and the requirements of the case, from a few hours to a month.

The most dramatic method of applying radium is by the concentration of several grams into a "radium bomb," which is virtually used as a source of intensely hard x rays, the patient being placed at a distance of a foot or more from the centre of the bomb. In the arrangement devised by Dr. Cheval of Brussels 4 grams of radium are embedded in the centre of a hugh block of lead weighing over a ton and supported on steel girders in the ceiling of one room and the floor of the room above. A double cone cut in the lead allows of the exposure of two patients to intense gamma ray radiation, one above and one below. So long as the attendants keep outside the cones, which are marked out by circles on the floor and ceiling, they are perfectly safe, whilst by an ingenious arrangement the radium itself can retire into a recess in the lead block or be advanced to the centre of the cone. The method is costly and very extravagant of radiation, but the results are said to be extremely good.

THE CLINICAL RESULTS OF TREATMENT BY RADIUM.

Turning to the clinical aspects of radium, brilliant results have been obtained in the treatment of rodent ulcer, of carcinoma of the cervix uteri, of carcinoma of the tongue and buccal cavity, and of carcinoma of the breast, in this historical order. It is now being applied in almost every region where cancer develops, and I feel convinced that complete success is only a matter of time. Every region presents its own peculiarities and its own difficulties, and methods which succeed in one region or with one type of growth may fail in another. The mere external application of radium may suffice to destroy a rodent ulcer or a carcinoma of the cervix; it will be futile in the case of the mouth or the breast, where much more drastic methods are required. To show, however, the range of its power I propose to describe very briefly a few of my own cases, making no claim that the results are permanent or that the methods which I have used are the best. The cases do, however, in my opinion, fairly represent the results which one may expect.

Carcinoma of the Palate.

A man of 55 came to see me last April complaining of a discomfort in the palate of three weeks' duration. At the junction of the hard and soft palate, and extending on to both and on to the alveolar margin, on the right-hand side, was a hard nodular mass of ulcerated fungating carcinoma. There was a large mass of hard glands in the right anterior triangle of the neck. The tumour was destroyed with my steam cautery, and the glands were dissected out completely. Healing was perfect in a fortnight, but three weeks later the tumour recurred.

In May I inserted into the base of the tumour six radon seeds, each containing 1.5 millicuries of radon. In fourteen days the growth had disappeared, and was replaced by granulations, in three weeks healing was complete, in six weeks there was no trace even of a scar, and he was wearing his toothplate. He remains in perfect health, with no sign of recurrence.

Epithelioma of the Lip.

A man of 65 was sent to me last September with a huge mass of growth involving the whole of the lower lip and extending almost to the chin. It had started a year previously as a small nodule at the left corner of the mouth. Six needles, each 2 cm. long and containing 2 mg. of radium, were inserted into the lip along the margin of the growth, and were left in place for a week. In three weeks the great bulk of the growth had disappeared, but a week later two small nodules still remaining were treated by the insertion of small radon seeds. A fortnight later the glands were cleared out from both submaxillary triangles, and as the margin of the lip was very ragged a narrow strip was taken from it. In such an advanced case a permanent cure is too much to expect, but the immediate result was remarkable, and from the cosmetic point of view it was extraordinarily good. A remarkable feature was the reappearance of a lip apparently destroyed by carcinoma, demonstrating conclusively the selective action of the radiation employed. No visible carcinoma remained, and, should recurrences appear, they can probably be dealt with by similar means.

Carcinoma of the Thyroid.

A lady of 70 came to me last September with the history that a small swelling, which had always been present in the neck, had for five weeks been growing rapidly, and was now producing severe respiratory obstruction. There was a hard nodular swelling involving both lobes of the thyroid, with several hard glands adjacent to it. It was fixed to the trachea and attached to the skin. It was regarded by myself and by Mr. Hayward Pinch as a typical carcinoma of the thyroid. It grew so rapidly that in ten days the circumference of the neck had increased by 1½ in. Twenty radon seeds, each containing 1.5 millicuries of radon, were inserted through two small punctures, one on each side of the trachea, and were distributed as far as possible throughout the tumour. In ten days the tumour had completely vanished, and although the neck was very thin the thyroid gland could no longer be felt. The circumference of the neck had diminished by 3 in., and all symptoms of obstruction had disappeared. She remains in perfect health.

Carcinoma of the Oesophagus.

A man of 72 had suffered from increasing difficulty in swallowing for three months, and he could now only swallow sips of water with great difficulty. A tall, powerfully built man, he had lost 3 st. in weight, and he was so weak that he could scarcely stand. An x-ray film showed that the oesophagus was obstructed by a malignant growth ten inches from the teeth. On oesophagoscopy a large ulcerated mass of growth was seen encircling the oesophagus, bulging prominently inwards on the left side. Into the substance of the growth eight radon seeds were inserted, each containing 1.5 millicuries. In twenty-four hours there was a distinct improvement in swallowing, which may, however, have been due to the passage of a bougie at the operation. In a week he was taking ordinary soft foods, and was obviously gaining weight and strength. In four weeks he was taking an ordinary full diet, with the sole precaution that he should eat slowly. In six weeks he had gained nearly 2 st. in weight, and appeared to be in perfect health.

Carcinoma of the Stomach.

A man of 53 had complained for three months of epigastric pain, increased by food, of loss of appetite, and of loss of weight, which he estimated at 2 st. On exploration a firm, smooth oedematous tumour of greyish colour was found involving the lesser curvature, and extending upwards almost to the cardiac orifice. It was regarded as a carcinoma of a rapidly growing type, and it was obviously quite inoperable. There were, however, no enlarged glands. Into the substance of the tumour were inserted six platinum needles, each 4 cm. long and containing 4 milligrams of radium element. They were so arranged as to radiate from a centre on the anterior surface of the stomach, and the threads collected here were buried in an invagination of the anterior wall of the stomach, formed as for a Witzel's gastrostomy. The threads were brought out in a bunch through the laparotomy

opening, which was then closed. Five days later the needles were withdrawn without difficulty. The patient made a normal recovery; his pain ceased, his appetite returned, and in three months he had regained his normal weight and was the picture of health.

Angioma of the Meninges.

A man of 45 had suffered for years from fits at long intervals. Recently the fits had become more frequent and severe, and they were now accompanied by loss of consciousness. They were Jacksonian in type, commencing in the left hand and spreading to the face and leg. Beyond a slight increase in the deep reflexes on the left side there was little to be made out on a neurological examination. On exposing the right Rolandic area by means of an osteoplastic flap formed with my craniotome, and on opening the dura, a mass of huge interlacing veins was found occupying the whole of the upper portion of the field, and forming a vascular tumour about three inches in diameter. As no direct treatment seemed practicable the dura was closed, and on to its outer surface were sutured six radium needles, each 2 cm. long and containing 2 mg. of element. The needles were arranged as the spokes of a wheel, and the attached threads were brought out through the central hole in the bone flap. The bone was replaced, the threads were brought through the scalp flap, and the scalp was sutured into position.

The after-history of the case was somewhat remarkable. Three days later he noticed a weakness of the left arm, which developed next day into a complete paralysis. On the following day the needles were drawn out by the threads without difficulty, having been in position for five days. A week later he had completely recovered the use of the arm. There has been no recurrence of the fits, and he seems to be in perfect health.

These cases are only chosen to show the effects which radium can produce in a great variety of situations, and under conditions where the ordinary methods of surgery are not applicable. The brilliant work of Regaud in Paris, of Hayward Pinch and his assistants at the London Radium Institute, of Keynes at St. Bartholomew's, of Cade and his colleagues at Westminster, of Birkett of Manchester, and of many others, has shown that in cancer of the uterus, of the skin, of the breast, and of the mouth and tongue, success can be depended upon as a routine. It has rather been my aim to show how wide are the powers of radium, and that where we have failed it is rather our method of application than our weapon itself which is at fault. I am convinced that we are only on the threshold of a great adventure; I feel that a new world of surgical technique is opening before us; I am beginning to believe that at last we hold in our hands the key to the cure of cancer.

SOME EFFECTS OF DEEP X RAYS UPON THE CELLS OF THE BLOOD.

A PRELIMINARY NOTE ON A PHAGOCYTIC TEST.

BY

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THE experiments about to be described are the result of an attempt to observe *in vitro* the effect of the rays employed in deep *x*-ray therapy upon the living cells of the blood. The rays used were the hardest that it has been possible to generate up to the present. The apparatus used was the latest type of constant potential generator with valve rectification, voltage 220,000, metalix water-cooled tube, filtration 1 mm. copper and 3 mm. aluminium.

That these rays have a destructive effect upon living cells is too well known to need discussion here. It is not clear, however, whether such rapid disappearance of white blood cells as occurs, for example, in cases of leukaemia undergoing deep *x*-ray therapy can be accounted for purely by this destructive effect on the cells themselves, or whether other factors come into play. It is more than probable that whatever direct injury occurs to the cells is caused by the secondary rays thrown out by all elements of sufficiently high atomic weight which obstruct the path of the original hard rays in their course through the body. The greatest cell destruction would then occur in the neighbourhood of foci producing these secondary rays, and the importance of this factor was clearly brought out in our first experiment.

A large block of clean paraffin wax was cast with outside dimensions of approximately 6 in. by 4 in. by 4 in. The block was divided longitudinally so as to form a close-fitting lid over a little central chamber hollowed out in the lower half of the block. The capacity of the chamber was about 2 c.cm. Freshly drawn, oxalated blood could be placed in the chamber and submitted to controlled irradiation.

The methods used in examining the blood will be described in the next paragraph. For the moment the important point to note is that if blood was placed in the simple paraffin block described, practically no lethal effect could be produced upon the blood within one and a half hours, however intense the irradiation. If, however, the little central chamber was surrounded by a layer of material relatively opaque to *x* rays, damage to the cells was very soon apparent. The most satisfactory method of producing secondary rays near the blood was found to be surrounding the little chamber within the paraffin block with a layer of blotting paper soaked in a solution of metallic salts, so that the paper was covered with a thin layer of wax and was separated from the blood only by this layer. Before the metal-containing paper was inserted, blood from cases of splenomedullary leukaemia placed in the chamber was submitted to full radiation for two hours—about six times the therapeutic deep therapy dose—but no definitely lethal effect upon the white cells could be detected. When the paper was inserted, damage to the cells could be observed after only fifteen minutes' similar irradiation. The more closely the chamber was surrounded by metallic salt—in other words, the more intense the secondary radiations—the more quickly were the white cells affected.

Methods of Observing Damage to Cells.

To examine individual blood cells while the blood was being irradiated in the chamber small samples were removed at intervals and thin films spread. These were stained by all the usual histological methods, but no certain differences could be made out to distinguish normal from damaged cells. The oxidase reaction was applied to the films and vital staining with cresyl blue attempted, but again no differences could be demonstrated. The only positive results were obtained when samples of blood, before and after irradiation, were kept under sterile conditions at laboratory temperatures up to three days, at the end of which wet film preparations stained with neutral red were made. It then appeared that nuclear degeneration had occurred more quickly in the irradiated white cells. But the differences were not sufficiently sharp to justify the method for quantitative purposes. It must also be explained that blood counts performed upon the samples of blood in the chamber during and many hours after irradiation showed no reduction in the number of red or white cells present. Furthermore, prolonged agitation of the blood in a mechanical shaker did not result in any breaking up of irradiated cells. In short, no actual reduction of the number of cells, red or white, in the blood could be demonstrated and no changes in staining reaction detected.

The Phagocytic Power of White Cells.

It seemed, therefore, that, in order to demonstrate the cell damage caused by the rays, some direct biological method must be used. Experiments were then made upon the phagocytic power of the white cells towards staphylococci, and this method has, we think, given definitely promising results.

Using a marked teat pipette, small equal quantities of blood were drawn during irradiation from the chamber at five- or ten-minute intervals, and to each was added the same amount of an emulsion of staphylococci in 1 per cent. citrate in normal saline. After allowing these mixtures to remain in the 37° incubator for five to ten minutes films were spread and stained with Leishman's stain, the whole procedure following the lines of an opsonic index determination. Direct examination of the films gave a reading of the percentage of white cells in any particular sample still retaining their phagocytic power. Loss of this power was taken to indicate a lethal effect upon the white cells.

The important points noted as a result of this experiment are as follows:

(*a*) If a normal or leukaemic blood be placed in the chamber and irradiated as described, complete loss of all phagocytic power in the polymorphs is observed within about thirty-five minutes.

(*b*) This loss of phagocytic power appears to be quite permanent. The experiment was varied in different ways and samples of blood given time to recover before examination, but no return of phagocytic power could be detected.

(*c*) In passing, it was noted that in fresh unirradiated bloods phagocytic power was possessed only by the relatively mature forms of polymorphonuclear and hyaline leucocytes. It is of interest that myeloblasts, myelocytes, and transitionals appear to have no phagocytic power towards the usual types of bacteria.

(*d*) The lethal effect appeared to begin upon the polymorphs at about the same point, whether in normal or leukaemic bloods.

Thus the experiments with the paraffin block appeared clearly to demonstrate a directly destructive effect by the rays on the white cells, and also that this destructive effect was produced mainly, if not entirely, by the secondary radiations and not by the original hard rays.

Some success with this method *in vitro* at once suggested applications of the test for phagocytic power upon the white cells of patients undergoing deep therapy treatment.

Direct Tests upon Irradiated Patients.

In this respect the first fact to be observed was that if blood from a leukaemic patient be taken twenty-four hours after deep therapy treatment and, as already described, mixed with staphylococci, a considerable number of the polymorphs, although they stain quite normally, will be found to have lost their phagocytic power. The test was therefore systematically applied to patients during actual irradiation. It was found that, whatever part of the body was irradiated, within about twenty minutes the percentage of actively phagocytic polymorphs began to fall. If the test was repeated at intervals a few other important points could be noted—namely:

(*a*) After full irradiation of the spleen in, for example, a case of splenomedullary leukaemia, although the first treatment will result in loss of phagocytic power in a considerable number of the polymorphs, the percentage varying according to the dose given and the width of the field irradiated, the proportion of white cells which disappear from the circulating blood within the next few hours is much less than this, and it takes a few days for all these damaged cells to be removed from the circulation.

(*b*) While the damaged cells are disappearing, a number of new normal polymorphs are being produced, so that a point is reached at which production and destruction balance each other and the immediate fall in the white count ceases. In some cases it may rise again slightly, and a test of the phagocytic power of the cells then shows that the rise is due to fresh normal cells.

(*c*) If these irradiated cases be, however, further watched it will often be found that although all the damaged non-phagocytic cells have disappeared from the circulation and a secondary rise, as above described, may even have occurred, still the fall in the white count continues. At this stage all the cells are normal in their phagocytic power, and the falling count can be accounted for only by some directly depressant action possessed by the rays upon the source of the cells—namely, the reticulo-endothelial system.

In short, it is evident that we can account for most of the immediate fall in the white count of irradiated cases of leukaemia by the directly lethal effect of the secondary radiations upon the blood cells themselves. But the more gradual later fall probably arises from depression of the white cell producing mechanism. Much further work must be done to confirm and elaborate such points as these, but the initial facts are put forward to illustrate the way in which the methods described appear to throw some light upon the mechanism of the deep *x*-ray treatment of leukaemia.

Irradiation and Normal Blood.

Let us next consider the effect of deep therapy upon the cells of patients showing a normal blood picture. Here, again, according to the intensity of the irradiation which their lesions have required, there is also a fall in the phagocytic power of their polymorphs and a gradual removal of the damaged cells from the circulating blood. This effect lasts for a few days, until, reproduction of new cells becoming gradually more effective, the white count slowly returns to normal.

It will at once be clear, however, that the ordinary methods of blood counting in any of these cases do not, at any particular moment, tell us how many of the patient's leucocytes are normal effective cells. Some such test as we have described must be applied before we can be sure they are functionally normal. We believe, therefore, that the test of phagocytic power in the polymorphs may have useful clinical application in the case of patients treated with deep therapy or other irradiation. Whether the results will be helpful in diagnosis and prognosis is at present under investigation. Meanwhile it may be worth while to note the following points.

The first concerns the known fact that actively septic patients, leukaemic or otherwise, are not usually favourable subjects for irradiation. The septic element often becomes more pronounced, and the demonstration of the rapid disappearance of phagocytic power in the leucocytes of these patients throws some light upon this antiseptic failure. If these patients must be irradiated, it is well to apply the test for phagocytic power so that this function of their white cells shall not be driven too low. For this purpose an ordinary white count is not sufficient.

Secondly, it is clear that the initial fall in a patient's white count, following irradiation, is a function of the number of directly damaged cells. By noting the loss of phagocytic power, even while irradiation is actually taking place, we can make an immediate estimate of what the fall in the white count will be and control the dosage accordingly. Using ordinary methods of blood counting, this fall has actually occurred before we can estimate it. Furthermore, in patients whose white cell count is already low, and in whom it is undesirable to cause too great a fall, a useful method of controlling dosage and of forecasting the white cell loss is the application of the phagocytic test. Irradiation may well be stopped at a point where not more than 25 per cent. of the patient's polymorphs have lost their phagocytic power. Any future irradiation would depend upon the restoration or otherwise of phagocytic power.

Summary.

A method is described of estimating the phagocytic power of the polymorphs in patients undergoing deep *x*-ray treatment, and some possible clinical applications of the test in treatment control are put forward.

Some results with the test are discussed in relation to the theories concerning the effects of irradiation upon leukaemic and other patients.

TONSIL PUNCTURE: A NEW METHOD OF INVESTIGATION.

BY

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DISEASE of the tonsils, as a clinical entity, has been known for many centuries. Celsus, who was born in Rome about the time of Christ, devotes a whole chapter to the subject in his *De Medicina*, and makes many references to tonsillar diseases in other portions of the work.

In our day acute and chronic affections of the tonsils rank among the diseases which are frequently encountered. The work which follows is concerned with the modern viewpoint of the tonsil as a source of focal sepsis. Among such sources the tonsils occupy an important position. Our present investigations have convinced us that this importance has not been exaggerated and that hidden infection in the tonsils may be responsible for much ill health, both definite and indefinite. Irwin Moore[1] gives a list of fifty-one diseases which may result from focal infection of tonsillar origin. The results of such infection may reach and affect any part of the body by way of the lymphatics or the blood stream. Moore states that the general opinion is that after the age of 5 years nearly all tonsils are

useless and are in the majority of cases a menace to health.

The tonsils are examined in every case when a search is being made for a possible source of focal sepsis in a patient, and it is a common experience to discover a tonsil or tonsils which can only be described as "doubtful"—that is, it is difficult to say if we are justified in advising their retention or their removal. The tonsil may even be small and fibrosed, and yet may be a potent source of trouble.

Although much may be learned by an experienced observer from an inspection of the tonsils *in situ*, and from any history which bears upon them, the standards of assessment as to their normality or otherwise have been somewhat arbitrary hitherto, and the personal factor must of necessity play a part in the examining physician or surgeon. We have tried to arrive at a more accurate estimate by means of direct puncture into the substance of the tonsil, with subsequent investigation of the aspirated material on lines which have been standardized.

Reasons for the Procedure.

In order to make clear our reasons for this scheme it is necessary to refer briefly to the structure of the normal tonsil and its alteration in chronic inflammatory disease. A normal tonsil consists of a mass of lymphoid tissue covered on its free surface with the stratified epithelium of the mucous membrane. Its surface is pitted with apertures leading into crypts, which are lined by a prolongation of the stratified epithelium of the surface, and into them the ducts of numerous small mucous glands open. The lymphoid tissue of the tonsil is at intervals aggregated into nodules, in which the lymph cells are more closely arranged than elsewhere. In the centre of these nodules active multiplication of the lymph cells occurs. In the lymphoid tissue are numerous blood vessels and lymphatic channels.[2]

In chronic inflammatory disease the appearances are changed. We find that the chief histological differences are in the crypts and in the epithelium of the surface. The continuity of the stratified epithelium of the crypts is frequently broken at the base of the crypt. In some instances there is a band of fibrous tissue around the crypt, lying close to the surface of the stratified epithelium which lines the crypt—a protective phenomenon in response to constant irritation in the crypt—and this fibrous band, like the stratified epithelium, is frequently broken at the bottom of the crypt. The epithelium on the general surface of the tonsil is rarely intact in such cases, and sometimes there are small areas of ulceration on this surface. The significance of such solution of continuity in the stratified epithelium is obvious. Organisms can obtain a free entrance directly into the tonsillar substance, and they can escape easily in a reverse direction, from the tonsil into the mouth, and be swallowed with the saliva.

Other pathological points which we have noted are a thickening of the capsule of the tonsil; an increase in the interstitial connective tissue, especially in the immediate neighbourhood of the crypts; and sometimes an increase in thickness of the walls of the vessels, affecting chiefly the fibrous layer of the wall. In sections stained by Gram's method it was difficult to pick out organisms, but some short-chained streptococci were occasionally seen in the part of the tonsil near to a crypt; in some cases there were minute abscesses immediately under the capsule; no tonsillar calculi were found.

In view of these findings we repeat that an inspection of the tonsil leads us only part of the way along the track. Particularly if Eve's suction method is employed, it is not unusual to see a crypt or crypts filled with a yellowish mass of micro-organisms or food debris. Although this might be one of the points in favour of condemning the tonsil, it must not be forgotten that this crypt may be intact at its base and may be almost, if not entirely, impervious to the entry of micro-organisms. In fact, the onward march of the latter may actually have been easier in a neighbouring wide-mouthed but empty crypt. The bacteriological investigation of a crypt may therefore be rather a hindrance than a help in determining the true condition of the tonsil. Since it is recognized also to be useless, from a bacteriological standpoint, to rely on cultural results from swabbing the surface of the tonsil, except in such conditions as diphtheria or Vincent's angina, we have adopted the plan of deep puncture into the substance of the tonsil.

Technique of Tonsil Puncture.

(*a*) *Apparatus Required.*

A supply of Bonain's solution, which consists of cocaine hydrochloride, menthol, and pure carbolic acid, 1 gram of each; a probe or forceps for a small pledget of wool, with which this solution is applied to the tonsil; a tongue-depressor; an all-metal syringe with guarded needles, made for us for this purpose by Messrs. Allen and Hanburys, and a test tube containing 5 c.cm. of sterile bouillon.

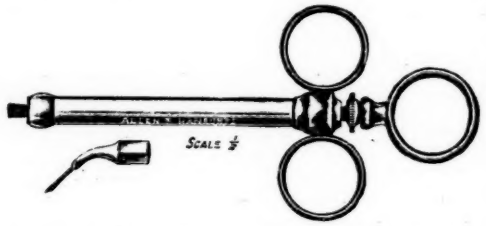
(*b*) *Procedure.*

The operator, wearing a head-mirror, sits facing the patient, and a good light is reflected on to the mirror from a lamp behind the patient's head. The tongue-depressor is inserted and the tonsils are examined. The anterior pillar of the fauces may be pressed upon by another spatula held in the operator's left hand, as recommended by Irwin Moore, thus enabling a thorough inspection of each tonsil to be carried out. After selecting a spot for puncture, which should be preferably in the fleshy portion of the tonsil, away from a crypt, the tongue-depressor is withdrawn.

A pledget of wool is twisted on to the probe or forceps and dipped lightly into the bottle of Bonain's solution. Before withdrawal the wool should be squeezed gently against the side of the bottle in order to get rid of any superfluous solution, which might drip in the patient's mouth.

The tongue-depressor is reinserted and the selected portion of tonsil is swabbed with the pledget of wool steeped in Bonain's solution, the carbolic acid in which makes the surface of the tonsil as aseptic as may be possible. The syringe, with its needle attached, previously sterilized by boiling, is taken in the operator's right hand. The piston is withdrawn about one-eighth of an inch, and is pressed home as the puncture is made. The positive pressure thus obtained tends to dislodge any organisms which might find their way into the needle as it goes through the surface of the tonsil. The needle is pushed into the tonsil as far as it will go; the distance from the point of the needle to its guard is three-eighths of an inch. Once in the tonsil the needle is rotated in various directions, the operator meanwhile exerting gentle suction by withdrawing the piston slowly. After four or five seconds the needle is withdrawn from the tonsil, and care is taken that the needle shall not touch any structure in the mouth during its withdrawal.

The syringe, with the needle attached, is introduced into the test tube containing the sterile broth. The point of the needle should come to a halt about an inch above the surface of the broth, and the piston is then pressed home firmly and quickly. The result is a jet of air, with pus or debris, which is



deposited on the wall of the test tube. Sometimes a definite bead of thick pus is seen, in other cases a small spray of greyish-white material is all that is visible. This material on the wall of the tube is inspected with the naked eye, and the broth is then shaken up so that it becomes thoroughly impregnated with the material which has been shot from the needle.

In rare instances nothing appears to come from the needle when the piston is pushed home. If this is the case, the needle should be introduced into the broth, and some of the latter should be sucked into the syringe and then be ejected. It is advisable to investigate both tonsils, as we have occasionally found one to be sterile and the other to be infected.

The wool plug of the test tube is flamed and replaced; the tube is labelled and put into the incubator, or kept in a suitable warm atmosphere for at least twenty-four hours. A smear from the culture is then stained and microscoped.

Results of Culture.

We have examined 158 tonsils by this method of puncture, the ages of the patients varying from 5 to 51 years. Of these tonsils 17 were found to be sterile on culture.

The following is a list of the organisms obtained from the remainder:

Streptococci were present in pure culture in 111 cases, and with other organisms in 26 cases. Using fermentation tests on the lines suggested by Mervyn Gordon, 81.2 per cent. gave the reactions for *Streptococcus pyogenes* and 18.8 per cent. gave the reactions for *Streptococcus viridans* or *mucosus*; 56.5 per cent. of the streptococci were facultative anaerobes, and 78 per cent. gave a haemolytic reaction on haemoglobin agar.

Diphtheroids were present in 4 cases; staphylococci in 18 cases (3 in pure culture); pneumococci in 5 cases (1 in pure culture); *B. influenzae* in 1 case. One patient who showed staphylococcal infection of the tonsil was suffering from sties and from a pustular eruption on the ear.

It is of interest to note that in two of the cases which were found to be sterile on puncture the patients had suffered from an acute inflammation in the tonsil about three weeks before the puncture was made. The inflammatory process had evidently acted as an efficient, though perhaps temporary, sterilizer of the tonsil.

We have found that little, if any, useful information can be obtained by direct examination of a smear obtained by tonsil puncture. Pus and epithelial debris are frequently present, but it is rare to find organisms in the smear itself.

The Blood Immunity Test.

If after thorough exploration with a needle in the manner which has been described there is no growth of organisms in the broth it appears to be reasonably probable that the tonsil in question is not a source of danger to the patient. But even if organisms grow in profusion in the broth, this is no proof that they are harmful to their host. We therefore pass on to the second stage of the investigation. The work of Solis-Cohen and of Cronin Lowe[3] has emphasized the importance of testing the immunity of the patient's own blood towards organisms obtained from some site of possible infection in his body.

Given accurate standards, with due care in obviating the effects of mass, it appears reasonable that a man's own blood should contain sufficient immune bodies to deal with a small number of organisms from his tissues. In order to obtain correct comparisons with which to work, the following plan was adopted.

A broth culture of streptococci was diluted with more broth until its opacity, after shaking up, was equal to that of a 2,000 million vaccine, and this standard is the one which we always use; 5 c.cm. of supposedly healthy human blood were run into each of five sterile test tubes. The blood in the first test tube was inoculated immediately with three platinum loopfuls of the above culture. The blood in the second tube was inoculated with 0.01 c.cm. of the culture; in the third tube with 0.02 c.cm.; in the fourth tube with 0.1 c.cm.; and in the fifth tube with 0.2 c.cm. Subcultures into broth were made from each tube the next day. It was found that the first tube, inoculated with three platinum loopfuls of the culture, was sterile; but the other four tubes showed a growth of streptococci on subculture. In them the effect of mass was felt.

We have adopted the three loopfuls standard, using a loop of the size shown , in testing the effect of his own culture on the resisting power of the patient's blood. We realize that such a standard is not infallible and that it may vary, temporarily or permanently, both as regards the immunity of the "normal" blood and the virulence or otherwise of the strain of organism used in testing. If growth occurs the supposedly normal individual may himself be harbouring, for example, a streptococcal infection. But we have found the three loopfuls to be a good working basis, since, as will appear later, a certain number of patients with infected tonsils can inhibit this strength of their own culture.

To sum up, the broth tube containing the material obtained by tonsil puncture is incubated for twenty-four hours. A film is then stained, and the organisms, if any, are identified. After taking the usual precautions in sterilizing the skin, a sterile needle is inserted into the median cephalic or median basilic vein of the patient, and 5 c.cm. of blood are run into a sterile test tube. This blood is inoculated immediately with three platinum loopfuls of his previously diluted culture; it is then incubated for at least twenty-four hours, and three platinum loopfuls of it are then subcultured into sterile broth. If the organisms originally present in the culture from the tonsil are found to have grown in this subculture, it is presumptive evidence that the resisting power of the patient's own blood is defective as far as the tonsillar organisms are concerned.

It happens not infrequently that more than one organism is present in the tonsil culture. In such cases the blood sometimes exercises a selective power, destroying one organism but failing to inhibit the other. The whole procedure which has been described is in reality quite simple, and can be carried out by any practitioner who is possessed of a suitable syringe, a supply of sterile broth, a platinum loop, and an elementary knowledge of bacteriology. Far from objecting to the investigation, we find that patients welcome it when its objects are explained to them. They realize that a thorough examination has been made, and for this reason they are more willing to submit to a subsequent operation if this is found to be necessary.

In trying any new method mistakes have to be rectified and alterations in technique have to be made. We propose, therefore, for the present, to refer only to the last 50 instances in which this procedure of blood inoculation has been carried out. All the cases showed signs or symptoms which justified an exploration of the tonsils. In these 50 instances the blood was sterile in 11, and grew organisms from the tonsil culture in 39. Neither the age of the patient, nor the sex, nor the type of organism appeared to have any effect as regards the immunizing power of the blood.

If the tonsil is found to be infected, and the patient suffers from such a condition as an arthritis for which no other focal cause can be found, and yet his blood possesses sufficient immunizing power to destroy the organism from the culture, we have had good results from the use of an autogenous vaccine, prepared from the tonsil culture. In this case, of course, the result may be due to non-specific protein shock.

Discussion of the Method.

It will be noted that the relation of adenoids to focal sepsis is outside the scope of our present investigation, which deals only with the method of tonsil puncture. If the tonsils have been found to be diseased and have been removed, the question of the results of the operation is also hardly germane to the present thesis, though it is tempting to record in detail the relief of symptoms and the mental and physical improvement which have almost universally followed the operation. To those patients in particular who have been just within the borderline of ill health for many years, with an absence of *joie de vivre*, and with a mental and physical state which was easily fatigued, as well as to those with more definite ailments, such as backache, joint pains, or skin affections, it comes as a surprise to hear that their tonsils have been found to be diseased. Their scepticism has frequently been followed by pleasant relief after operation. The hitherto uninvestigated tonsil has much to answer for.

We do not wish it to be thought that our interest in the investigation of the tonsils has led to any loss of perspective. We realize the importance of, and deal frequently with, such other sites of infection as the teeth, the nasal sinuses, the genito-urinary tract, and the alimentary tract. As regards the teeth, our profession passed through a phase in which wholesale extraction played a not inconspicuous part. Time brought radiography and saner judgement. We hope that the method of tonsil puncture, especially when it is developed and improved, may save unnecessary tonsillectomy on the one hand, and lead to highly necessary tonsillectomy on the other hand.

An interesting question has been put to us by a colleague: Is it possible that the organisms which are hidden in the tonsil may serve a purpose in the production of antibodies and thus help to immunize the individual by a process of auto-inoculation? This question was introduced by Good many years ago in relation to the crypts. If this is so, removal of the tonsils might be undesirable. Such a process may possibly occur in those cases in which the blood is found to be sterile after inoculation with the organisms. But in other cases, where the blood is not able to resist the organism, we believe that removal of the diseased tonsil is sound in theory and in practice.

Although the tonsil may be the chief source from which the organisms and their toxins pour into the blood stream, the other structures in Waldeyer's ring are frequently found to be infected also, as witness the pharyngeal discomfort which may not clear up for weeks or even months in an adult after the tonsils have been removed and the tonsillar fossae are firmly healed.

In view of Rosenow's work on the selectivity of various strains of streptococci, it would be interesting to know if there is any association between hitherto hidden streptococci in the tonsil and streptococci in the appendix, which, from its structure, has been called the abdominal tonsil, and also if such hidden tonsillar infection may be associated with gastric, duodenal, and jejunal ulcers. The occasional occurrence of the latter after gastro-jejunostomy has never, to our knowledge, been explained satisfactorily. In making such a suggestion we are assuming that the teeth and other possible foci of streptococcal infection have received due attention.

At the risk of reiteration we wish to stress once again the fact that a mere inspection of the tonsils in such cases may lead to an error of judgement, whereas tonsil puncture and thorough investigation may throw light on what has hitherto been obscure in the matter of a cause.

USES AND POSSIBILITIES OF TONSIL PUNCTURE.

We hope that this method of investigation may be of use to the physician who is endeavouring to trace a focal sepsis, which may be chronic in its manifestations, giving rise to such conditions as fibrositis, arthritis, and neuritis; or acute, in the form of a streptococcal septicaemia whose origin may be baffling. It may be useful to the aurist and laryngologist, both in assessing the condition of the tonsil *per se*, and in relation to affections of the ear and larynx which may spread from hidden tonsillar infection; to the general surgeon, for whom the effects of focal sepsis are also important; to the ophthalmic surgeon, since tonsillar infection plays a part in many eye conditions; to the dermatologist, in helping to solve the problem of certain skin affections; to the neurologist and psychiatrist, since it is becoming increasingly evident that many psychoneuroses and true psychoses may be associated with focal sepsis; and to many other branches of our profession.

We ourselves wish to stress its possibilities in connexion with two outstanding diseases—namely, puerperal septicaemia and carditis. Space will not allow us to go fully into this question, but we should like to outline our views.

We believe that many cases of puerperal septicaemia result from auto-infection, wakened into activity by the stress of labour. The teeth, the urine, and other possible sites of infection in a pregnant woman are now examined as a routine, and we suggest that the tonsils should receive more attention in this respect. If, by puncture, they are found to be infected, particularly by a member of the streptococcus group, and if the woman's immunity is found to be deficient on blood culture, we suggest that an autogenous vaccine should be prepared from the tonsil culture and administered at intervals throughout the pregnancy in order to raise the general resistance as far as possible.

In relation to the prevention of carditis we have high hopes of the usefulness of the method.

It will be seen from the figures we have given that the streptococcus is the organism most commonly found on tonsil puncture. This finding may have some bearing on the question of person-to-person infection in rheumatism, since the streptococcus may be air-borne, especially under crowded and insanitary conditions.

In the report of the Subcommittee of Inquiry into Rheumatic Heart Disease in Children[4] we find that "it is universally recognized that the portal of entry of the infecting organism is, in the majority of cases, through the nasopharynx in general and the tonsils in particular." And again, "In spite of certain difficulties, there is no rival to the streptococcic theory of acute rheumatism." Although the additional question of environment as a predisposing cause must not be forgotten, it seems to us that, from the all-important point of view of prophylaxis, it is essential to know if the tonsils of a child are harbouring a member of the streptococcus group.

Another significant fact is the age of onset of acute rheumatism. "First attacks of the severer types occur most commonly about the seventh or eighth year of life," and the tonsils appear to lose their usefulness after 5 years of age. From that time it seems that they cease to be defenders and become attackers. We urge, therefore, that the tonsils of children, particularly those over 5 years of age, should receive due attention from the point of view of exploratory puncture. The procedure is not a difficult one and should require only the same degree of tactful handling as is shown by the school dentist, whose visits, at first a source of apprehension, are now tolerated freely. In the case of a very nervous child we would go so far as to suggest that an anaesthetic should be given for the purpose of tonsil puncture.

If the tonsils yield no growth on culture, they are free from suspicion for the time being, though, of course, the question of adenoids must be borne in mind. The lapse of one or two years, or an attack of sore throat in the meantime, are indications for further tonsil puncture. Should the tonsils be found to harbour streptococci, the child is a potential sufferer from rheumatism, and the removal of the tonsils is a wise step, even without testing the resistance of the child's blood to the organism obtained by puncture, since it is not always easy to obtain blood from a child's vein. If the tonsils are found to be infected we can put the position clearly before the parents of the child.

Although tonsillectomy may not entirely prevent rheumatism, the results of the operation are eminently encouraging, and the report[4] states that "in no case did permanent heart disease show itself for the first time in a rheumatic attack after operation."

We hope that if this method of investigation is adopted, with a wide spreading of the net, it may do much to prevent heart disease in childhood. As regards adults, many sufferers from heart disease acquired such disease in their early years. In the future such early acquisition may be avoided, and it may be possible to reduce the general incidence of heart disease in later life if the tonsils receive due attention by puncture, remembering, of course, other foci of infection also. Heart disease, when once it is established, is an end-result. Our plea is for the efficient investigation of one of the principal sources from which it is known to arise, and for the eradication of such a source when necessary as a measure of prophylaxis.

SUMMARY.

1. Hitherto the condition of the tonsils has been judged chiefly from external appearances.

2. A simple method of tonsil puncture has been described. If the tonsil is found to be sterile removal is probably unnecessary.

3. Should the tonsil be found to be infected, the organisms can be tested against the patient's blood and some idea of the resisting power of the latter to the organism can be obtained.

4. If the immunity of the blood is found to be impaired, removal of the tonsils is probably desirable, other things being equal.

5. Uses and future possibilities of the method are discussed, particularly in relation to puerperal septicaemia and to rheumatic carditis in children.

We wish to express our thanks to our colleague Dr. J. M. Wishart, assistant ophthalmic and aural surgeon, Blackburn and East Lancashire Royal Infirmary, for his interest in the investigation and for allowing us to examine suitable cases; also to Mr. H. W. Floyd, of the laboratory staff, for his help in technical matters.

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CEPHALIC TETANUS.

BY

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WE wish to record the following case of head tetanus as it is an uncommon condition, not often reported, and consequently not well known to the profession.

CLINICAL NOTES OF CASE.

A well-developed boy, aged 12 years, was referred on December 15th, 1927, with the following history. A week previously he had been struck with a cricket bat on the right side of the face. The cheek and side of the nose had been bruised, and an irregular wound caused. This had discharged freely, and a splinter of wood had appeared three days after the accident. Five days after the injury facial paralysis appeared on the right side, and the next day he noticed that the jaws were stiff and he could not open his mouth. He rapidly appeared to become very ill, and the rigidity of the jaws had become extreme.

On examination his general appearance suggested an overwhelming toxaemia. He was of a greyish colour, restless, and emotional, and his respiration was slightly laboured, with a rattle due to mucus collecting in his respiratory tract. There was complete facial paralysis on the right side. Trismus was intense, and he was unable to speak or swallow. He had slight spasm of the facial muscles on the left side. The muscles of the neck were not appreciably affected. There was some hypertonus of the arms.

The wound was about half an inch long, and was situated at the junction of the nose and cheek. His temperature was 96.5° F. and the pulse 80. Subsequently the temperature ranged for the most part a degree or two above normal.

Treatment and Subsequent Course of the Disease.

His condition was improved with 10 per cent. glucose per rectum, and three hours after admission, under chloroform anaesthesia, suboccipital cisternal puncture was performed, and 15,000 units of antitetanus serum were injected after the removal of an equal volume of cerebro-spinal fluid. A further 15,000 units were injected into the facial nerve from its exit from the skull to its peripheral distribution near the wound; 20,000 units were given intravenously. The wound was then opened up and eusol dressings were applied. The jaws relaxed under deep anaesthesia, and opportunity was taken to tie corks between the teeth in order that subsequent feeding could be carried out.

During the next twelve hours his general condition improved slightly, and under anaesthesia 20,000 units were injected into the cisterna by suboccipital puncture, 20,000 intravenously, and 10,000 into the facial nerve distribution. He improved still further, though trismus and facial paralysis were unchanged. Swallowing was still difficult.

On December 18th 20,000 units were given intravenously. The next day, though the temperature and pulse were both still high, there was improvement in the general condition. Trismus was still severe, and any interference with the corks between the teeth increased the spasm; though urged to swallow sips of water and milk the patient was manifestly afraid to attempt this. There was no tendency to generalized spasm. Under chloroform anaesthesia 10,000 units of antitetanus serum were given into a vein.

The following day the slight improvement already evidenced was maintained, but fluid by the mouth was piteously refused, the patient being terrified of attempting to swallow. There was a noticeable smell of acetone in the breath, and this remained evident for nearly a week longer, in spite of the fact that copious enemata of glucose and water and of sodium bicarbonate solution were regularly given and satisfactorily retained. On this day, December 20th, chloroform was administered, and 10,000 units were given intravenously, and the opportunity was taken to remove the corks, which were almost bitten through. These were replaced by two round wooden blocks fashioned like little cotton-reels, adjusted between the bicuspid teeth on each side and fastened together by a string behind the head. Improvement was slow, but occurred day by day.

On December 22nd there was complaint of soreness in the shoulders and arms, but no spasm except in the masseter. Under chloroform 10,000 units were given intravenously and 10,000 into the spinal theca by a puncture in the upper lumbar region, after the withdrawal of a corresponding quantity of cerebro-spinal fluid.

On December 24th, 26th, and 28th intravenous and subcutaneous injections of 10,000 units each were given under anaesthesia. On December 29th trismus was noticeably less, and for the first time the patient allowed one to remove the wooden props, and was able voluntarily to separate his jaws half an inch. He took sips of water, and sucked a small piece of orange. The props were replaced for the night.

The next day he was better still, and took a little drink of milk. Barley sugar was given him to suck, and from this time on the starvation acidosis seemed to disappear, and acetone was no longer present in the breath or the urine.

As his confidence in his swallowing powers returned his diet was steadily increased, the wooden props were dispensed with, and he began to speak intelligibly. On account of this rapid improvement it was thought that further administration of serum was not required, but in view of subsequent events this discontinuance, even in face of the steady abatement of symptoms, was probably unwise.

For the first week of January improvement was steady, and the boy began to eat with appetite, indeed almost ravenously, and to sleep soundly for ten or twelve hours at night. He was allowed to sit in the sun on a balcony for an increasing time each day, and then to walk from his bed to the balcony. All this time, though trismus had been abating steadily, the right-sided facial palsy was still complete. In addition, there was a frequent rise of temperature to 99° or 99.6° F., usually in the evening, but sometimes occurring at other times. Accordingly, on January 10th, after an experimental minute subcutaneous dose, 25,000 units of serum were given subcutaneously and intramuscularly with no ill effect, and with a subsequent lowering of the temperature on the next two days. On January 12th 10,000 units were given, also subcutaneously, and on January 16th 10,000 units were given intravenously; following this there were marked anaphylactic symptoms within a few minutes of injection. Abdominal discomfort, vomiting, diarrhoea, pallor, generalized urticaria, and a pulseless condition caused some alarm. Adrenaline, injected at once, was associated with rapid improvement.

The patient was discharged to his home on January 23rd. He could then open his mouth half an inch. The paralysis was not quite complete. He still looked very frail, and his evening temperature was 99° to 99.5° F. During the past two months the paralysis and trismus have completely cleared up. His general health is now good.

We attribute his recovery mainly to the massive doses of serum administered, and more especially to the route used in this particular case. Both experimental and research investigation seem to point to the advisability of getting the serum to the area in which the toxin is concentrated, and in this case it was possible to carry this out very completely. The injections into the cisterna gave a high concentration in the region of the pons and medulla and intracranial course of the seventh nerve. The injection into the facial nerve distribution from the stylo-mastoid foramen to the region of the wound increased the concentration still further. Serum not utilized locally by these injections is absorbed and adds to the effect of the intravenous and subcutaneous doses.

Summary of Amounts of Serum given and Route Adopted.

Date.	Cisternal.	Spinal.	Intravenous.	Subcut. or Intramusc.	Facial Nerve and Wound.	Total Units.
	Units.	Units.	Units.	Units.	Units.	
Dec. 15...	15,000	—	20,000	—	15,000	50,000
,, 16...	20,000	—	20,000	—	10,000	50,000
,, 18...	—	—	20,000	—	—	20,000
,, 19...	—	—	10,000	—	—	10,000
,, 20...	—	—	10,000	—	—	10,000
,, 22...	—	10,000	10,000	—	—	20,000
,, 24...	—	—	10,000	10,000 (I.-M.)	—	20,000
,, 26...	—	—	10,000	—	—	10,000
,, 28...	—	—	10,000	10,000	—	20,000
Jan. 10...	—	—	—	25,000	—	25,000
,, 12...	—	—	—	10,000	—	10,000
,, 16...	—	—	10,000	—	—	10,000
						255,000

COMMENT.

Cephalic tetanus was first described by Rose in 1872. By 1911 some ninety-four cases had appeared in the literature, and Brown[1] gives an excellent summary of cases reported up to that time. In 84 per cent. of these cases

the first sign of the disease had been trismus, either alone or accompanied by paralysis of one or more cranial nerves. The mortality in which paralysis preceded trismus was 64.2 per cent., as compared with 53.2 per cent. for cephalic tetanus as a whole. Paralysis of the facial nerve was the commonest form of paralysis and appeared on the side of the lesion. Bilateral paralysis had occurred in seven cases, but in all but one the wound had been in the mid-line of the head.

Since this time relatively few cases have been reported. Most of these have been in Continental literature. The rarity of the condition is shown by the fact that the *Medical History of the War*[2] reports only two cases of head tetanus out of 2,529 cases of tetanus occurring on the Western front. A very complete description of head tetanus is given by Courtois-Suffit and Giron,[3] and an admirable illustration by Quervain in *Clinical Surgical Diagnosis*.[4]

The prognosis in head tetanus is, judging from mortality statistics in the cases recorded, much that of the more common generalized form. The incubation period is less, apparently owing to the shorter distance the toxin has to travel, but even with a short incubation period—provided the spasm remains localized to the muscles of mastication—the prognosis is not affected. It would appear that the patient's attention is drawn to his condition earlier in head tetanus, and consequently treatment is more likely to be offered before the toxin has spread to other parts of the nervous system.

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[2] *Medical History of the War*, vol. i, p. 162.
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[4] Quervain: *Clinical Surgical Diagnosis*, third edition, p. 109.

ADENOMA OF THE LIVER WITH MALIGNANT CHANGES ASSOCIATED WITH INFANTILISM.

BY

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CASES of adenoma of the liver are uncommon, but the association with infantilism and the development later of malignancy in the tumour make this case of especial interest.

Clinical History.

A domestic servant, aged 19, was admitted to the Horton General Hospital, Banbury, on September 9th, 1927, complaining of vomiting and diarrhoea. Up to the age of 13 the patient had been healthy and of normal growth. Since that time she had ceased to grow, and there had never been any menstrual periods. Mentally she was bright, and up to the average standard at school. In every other way her health was excellent. Three weeks before admission she began to have attacks of vomiting two or three times daily soon after food; this was unassociated with nausea, and the appetite was good. There was no complaint of pain. At the same time diarrhoea came on. The only other symptom was an aching pain in the region of the right iliac fossa, which began the day before admission and aggravated the vomiting; the appetite, however, was still unaffected. There was nothing to note in the past history beyond the arrest of development at the age of 13. She had a mother and father and five brothers and sisters living and in good health.

On examination the patient appeared undersized for her age, her height being 4 ft. 8 in. and the weight 4 st. 10½ lb., but she was otherwise healthy. The eyes were normal. There were a few slightly enlarged cervical glands on both sides, but the thyroid appeared normal. The skin of the whole trunk showed a faint brownish pigmentation. There was no abnormality in the chest. The abdomen moved well on respiration, but was uniformly distended. Pubic hair was present. There was no tenderness. The liver edge was palpable 2½ in. below the right costal margin. The spleen and left kidney could not be felt. In the right flank was a mass of dense consistency, deep to the parietes and having an irregular craggy surface. Above, it was continuous with liver dullness; below, it extended to within 2 in. of the anterior superior iliac spine. It was fairly mobile antero-posteriorly and laterally. Above Poupart's ligament on each side irregular craggy masses could be palpated. No free fluid could be detected. Knee-jerks were present and equal. There was no oedema of the ankles. The urine was acid, specific gravity 1020, no albumin or sugar.

The diarrhoea and sickness improved during the first three weeks in hospital, but the abdomen slowly increased in size, the tumours showing no appreciable change. Four weeks after admission free fluid was definitely detected, and after this the girth of the abdomen increased more rapidly. Two weeks later oedema of both ankles developed, and the superficial abdominal veins became very dilated.

On October 31st (about seven weeks after admission) the abdomen was tapped to relieve dyspnoea and general discomfort, and 8½ pints of clear sticky light yellow fluid were drawn off. This contained 2.3 per cent. of albumin, and in the centrifugalized deposit were little masses of tissue cells such as might be shed from some growing epitheliomatous structure. On November 11th a further 3½ pints were drawn off. From this time the patient went rapidly downhill, and died, after being comatose for twenty-four hours, on November 17th—ten weeks after admission. Throughout the patient was apyrexial, and the pulse rate averaged 80 to within the last fourteen days, when it ranged between 100 and 130.

Pathological Findings.

Post-mortem examination revealed some clear blood-stained fluid free in the peritoneal cavity. The great omentum was much thickened and enlarged by numerous knob-like deposits of growth, which completely covered its surface. All other peritoneal folds, and the abdominal surface of the diaphragm, were studded with these knob-like masses of growth closely set together. On the right side of the abdominal cavity, extending down from the liver, was an elongated mass about 5 in. long by 2½ in. by 3 in. Its upper pole was embedded in the right lobe of the liver, but marked off from the liver substance by a definite capsule. It was separate from the right kidney and suprarenal. On section it was firm, and had a hard core of fibrous tissue with a small calcified patch in the centre. The liver itself was somewhat enlarged, and showed congestion on section; there were one or two knobs of growth on its surface. The gall-bladder was normal. The kidneys and suprarenals were a little congested, but otherwise normal. The pancreas was normal, and the spleen was not enlarged. The pelvic organs were set in a dense mass of knobby growth, which surrounded and pressed on all the vessels. The uterus and tubes, which were dissected out with difficulty, were infantile, and the ovaries could not be distinguished. There was no retroperitoneal growth. Examination of the brain, head and neck, and thoracic organs revealed nothing of note.

Dr. A. G. Gibson of the Radcliffe Infirmary, Oxford, very kindly made a histological examination of the growth. The elongated tumour embedded in the liver showed hypertrophied masses and strands of liver substance. At one spot in the capsule of this growth there was evidence of rapid metastasis into the peritoneal tissue. The secondary growth in the peritoneum showed evidence of much more recent and rapid cell formation, and consisted of strands of liver-like cells with a fibrous stroma. There was no resemblance either in the primary or the secondary growth to a suprarenal or a kidney growth.

Comment.

The tumour was presumably an adenoma of the liver with secondary malignant changes. These rare tumours are described as being often congenital, and the structure of this one, with its fibrous and calcareous centre, goes to show that it must have been of slow growth and present for some long time. When they occur, malignant change is not an uncommon sequel.

It was difficult to account for the lack of development, which did not appear to conform to any well-known type. Deficiency of anterior pituitary lobe secretion at first seemed a possibility, but *x* rays showed a normal skull, and *post mortem* there was no macroscopic abnormality of the gland. Moreover, the presence of pubic and axillary hair is an unusual feature of this condition. The thyroid gland was normal in appearance, and in other ways the patient did not conform to the type of under-development associated with hypothyroidism. Renal infantilism was a third possibility, but the urine was always normal, and the kidneys showed no marked change. Chronic diseases in childhood may delay development, and it would seem, therefore, that in this case the infantile condition of the patient is to be attributed to the state of cachexia produced by a long-standing liver tumour.

My thanks are due to Dr. Penrose of Banbury, under whose care the patient was admitted to hospital, for permission to publish this case, and for suggestions in putting together these notes.

Memoranda:
MEDICAL, SURGICAL, OBSTETRICAL.

TREATMENT OF HAEMOPTYSIS.

THE method here described for the arrest of haemoptysis by the supraglottideal injection of adrenaline was proposed by my assistant, Dr. Giuffrida, in the course of our joint studies on the local treatment of pulmonary tuberculosis. The injection is carried out by means of a 5 c.cm. syringe, to which is fitted a cannula 2 mm. in diameter and 11 cm. in length, of which the distal 4 cm. are bent on the remainder at an angle of 110°. The material injected consists of 1 c.cm. of a 1 per cent. solution of adrenaline, to which has been added 2 c.cm. of boiled water. The patient, who must be in a good light, is asked to breathe as slowly and deeply as possible, while the operator, holding the tongue between the thumb and forefinger of the left hand and the syringe in the right hand, introduces the cannula along the side of the tongue to the epiglottis, and during a deep inspiration injects the solution. The patient's body is now inclined towards the diseased side, so that the drug may be distributed along the bronchial surfaces to the affected area. The haemorrhage usually stops at once, the method having failed in only six out of a hundred cases. Recurrences may be prevented by repeating injections twelve-hourly for three days, or even six- or eight-hourly should recurrence take place in under twelve hours. Dr. Giuffrida has shown that adrenaline introduced intratracheally has only a local haemostatic action and is without appreciable effect on the blood pressure. The value of the method has been confirmed by Cioffi and Grossi, but does not appear to be as well known as its practical worth would justify. I think the reason for this is that the technique is thought to be complicated and delicate, and its performance to require training and experience. This is not really the case. Although supraglottideal injections may be difficult under normal conditions owing to pharyngeal and laryngeal irritability it is usually easy in the patient with haemoptysis whose psychic condition is associated with a diminution of reflexes.

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TREATMENT OF ACTINOMYCOSIS.

IN view of the recent reports of the successful treatment of actinomycosis the following account may be of some interest, even although the result was not happy.

A young man, aged 21, was admitted to hospital on May 28th, 1927, complaining of abdominal pain and vomiting of about ten days' duration. There was a cough, accompanied by mucopurulent sputum, and some rigidity on the right side of the abdomen; indeed, for a time the case was closely observed in view of the possibility of appendicitis. However, in a few days the abdominal signs largely disappeared and, with the development of dullness and other signs of consolidation at the right base, a diagnosis of pneumonia was made. The patient was discharged on June 29th, 1927. The general condition was not good, although all physical signs in the chest and abdomen had cleared up.

On August 23rd, 1927, the patient was readmitted as a case of tumour of the pelvis, there being burning pain on the left side of the abdomen of about three weeks' duration. He had not been fit for work since dismissal, but had not been confined to bed. Examination showed the presence of a firm swelling occupying practically the whole of the left iliac region, and extending an inch or two to the right of the middle line; it was subtympanitic to percussion, and tense, but not fluctuant. The affected area was somewhat board-like to the touch. A rectal examination was negative. The condition was thought to be probably a tuberculous abscess in the abdominal wall. Examination of the lungs was negative. By August 25th the patient was running an intermittent temperature. The swelling was now fluctuant, so it was incised; an abscess cavity in the abdominal wall was opened, and a fair quantity of blood-stained "cold" pus evacuated. This was examined microscopically, but the report was indefinite. The induration surrounding the area gradually increased, and a clinical diagnosis of probable actinomycosis was made. Granules were observed in the pus, and these, when examined microscopically, showed streptothrix mycelium. The condition gradually became worse. Sinuses developed in the hypogastric and right iliac regions, some of them discharging faecal material, and death ensued on May 16th, 1928.

Treatment began in 1927 with the administration of intravenous injections of collosol iodine; 1,176 c.cm. were thus given between September 11th and 29th. Thereafter, until October 21st, collosol iodine was given by mouth in doses of 1 oz. three times a day. On October 25th treatment with the French tincture of iodine in milk began, the initial dose being 2 minims twice daily; this was gradually increased up to 7 minims twice daily; it was discontinued about the end of February, 1928. The iodine was well tolerated, but clinically the condition did not improve. *X*-ray treatment was also employed under competent directions. No vaccine therapy was tried.

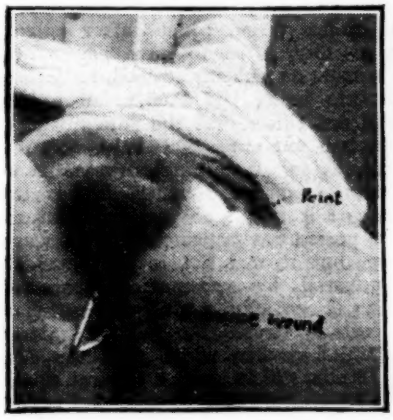
H.M.S. *Rosemary*, Portsmouth. D. LIVINGSTONE POW, M.B.

ACCIDENTAL TRANSFIXION OF PELVIS BY A METAL STAIR-ROD.

THE following clinical details of an interesting surgical case appear to be worthy of record.

A steelworks labourer, aged 35, was admitted to the Royal Infirmary, Sheffield, on September 28th, 1928, after an accident. While going downstairs he trod on the end of a loose stair-rod, and fell heavily, in a sitting position, on to its upturned end, which penetrated his perineum. He walked a few yards crying for help, and then fell to the floor, being seized with very severe pains down his left thigh.

On admission he was seen to be lying on a stretcher in the knee-elbow position with his knees apart, and though obviously in great pain he was not suffering from any marked degree of shock. About twelve inches of a bent thin brass stair-rod protruded from his perineum. The entrance wound was just to the



right, and in front of the anus, and the buried portion, which was afterwards found to be about ten inches in length, traversed the pelvic cavity; the distal end could be seen sticking up under the skin of the abdominal wall in the left iliac region, as shown in the accompanying reproduction of a photograph which was taken after he had been anaesthetized.

The patient was anaesthetized in the knee-elbow position, prepared for operation, and then turned over into the lithotomy position. After rectal examination and the passage of a full-sized metal catheter had shown that the bowel, urethra, and bladder had escaped injury, the stair-rod was pulled out with some difficulty.

The entrance wound was then excised, and the track of the rod was found to run through the central point of the perineum just posterior to the bulb of the urethra. The patient was then placed on his back, and the distal part of the track was exposed by a curved incision in the left iliac fossa. After division of the muscles of the abdominal wall the intact peritoneum was stripped back, and the contused blood-stained track through the substance of the ilio-psoas muscle was seen to run down into the pelvis, deep to the undamaged external iliac vessels. The peritoneum had escaped injury, as the rod appeared to have passed from the central point of the perineum between the layers of the levator ani muscle to the wall of the pelvis, which it followed closely in its upward course round the brim into the iliac fossa. The peritoneum was not opened, as there was no sign of effusion into it; both wounds were stitched up without drainage; the patient was given 1,000 English units of antitetanic serum and 25 c.cm. of anti-gas-gangrene serum.

On the day after operation it was obvious that the left anterior crural nerve had been injured, as a complete paralysis of the quadriceps extensor group of muscles was associated with anaesthesia of the skin over the anterior and inner aspects of the left thigh. The abdominal wound healed by first intention, while the perineal wound for some days showed signs of mild infection. The limb was put up on a back splint, and treated daily by massage and galvanism, and the man was discharged to out-patients on November 6th with the leg in a walking calliper splint.

I am indebted to Mr. T. B. Mouat, who performed the operation, and to Mr. Finch, under whose care the man was, for permission to publish particulars of his case.

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Reports of Societies.

ULTRA-MICROSCOPIC VIRUSES.

RESUMED DISCUSSION AT ROYAL SOCIETY.

THE discussion on ultra-microscopic viruses infecting animals and plants, which was opened at the Royal Society on February 28th (reported in the *British Medical Journal*, March 9th, p. 447), was continued on March 14th, with Sir DAVID PRAIN in the chair.

Vaccinia and Variola Virus.

Professor J. C. G. LEDINGHAM, chief bacteriologist of the Lister Institute, said that his impression, after listening to the first part of the discussion, was that these ultra-microscopic viruses appeared to be similar in most of their characteristics and pathogenic features to visible bacteria, the only difference being one of dimension. Further enlightenment, he thought, would come on the microscopical side through the efforts of Mr. Barnard and his colleagues. Professor Ledingham then passed on to consider the variola virus and the extraordinary transformation after passage through animals, such as the ox and calf, which had made vaccination against small-pox possible. There was a parallel in rabies virus, which, after passage through rabbits, was so altered as to have power no longer to infect dog or man on subcutaneous inoculation, and this had brought into being the Pasteurian antirabic treatment. He did not think that the possibilities of securing living attenuated variants had been quite adequately explored in connexion with animal viruses. It was possible that the immunity conferred by the killed virus was not of long duration; it might be just sufficient to give protection for the period during which the host was susceptible to the disease, but it was not in the same class as the immunity conferred by vaccination against small-pox. With regard to tissue affinity, it had been shown that in the case of certain viruses the point of attack was the reticulo-endothelial system, which took the chief part in the defence. Much which was of general applicability to the study of viruses had been gathered from experiments designed to test how far their proliferation in the tissues could be inhibited or enhanced by the artificial alteration of the "seed-bed" into which they had been introduced. It was known that the action of a virus could be enhanced by adding to it some tissue extracts, or be inhibited by causing some inflammation of the skin—for example, by *x* rays or the injection of Indian ink. In this respect these viruses did behave very similarly to visible bacteria, and were influenced in the same way. The question of combined virus and bacterial action was also interesting. The classic instance was the association of *B. suipestifer* with the virus of swine fever.

Dr. R. N. SALAMAN, director of the Potato Virus Station, Cambridge, spoke of virus disease as affecting the potato plant. It had been suggested that physiological disturbances due to the introduction of a foreign protoplasm into the plant might be the cause of virus disease, but from experiments, of which he gave an account, he thought it could be concluded that in the potato there was a virus disease which was certainly not due to any physiological disturbance. One curious feature of the potato experiments was that the potatoes of the best varieties were the best carriers. The differences in tolerance were rather striking, and simply from the different degree of the plant's tolerance two varieties of disease could be distinguished one from the other when both produced the same symptoms.

Evolution and the Virus.

Professor F. W. TWORT, superintendent of the Brown Institution, University of London, said that if the ordinary theories of evolution were accepted it must be admitted that the bacterium was a highly organized being, and that there existed forms which were more primitive, otherwise the evolution theory would have to be modified. If there were these more primitive forms in existence it seemed not unreasonable to think that the viruses might be representatives of such forms, and if they existed as viruses in disease it was probable that they existed also outside disease. It would also follow from the supposition that these viruses were representatives of more primitive forms of life, that they must have existed before the organic world was built up, and thus could not have had originally organic material as their foodstuff. They must have obtained their energy from some other source—for example, atmospheric or electrical. It was well known that there were certain atmospheric conditions, particularly those involving electrical disturbance, which had considerable influence on certain states known to be associated with bacteria—for example, decomposition of milk. Climatic conditions also affected materially the appearance and extent of certain effects. Ordinary bacteria, again, would show differences in action according as to whether they were placed in a copper-lined incubator or in a cupboard open to any electrical disturbance that might be present. The speaker suggested that beyond the ordinary radiations which were known to be beneficial or even essential to man—the rays of light and heat—there were other rays of much higher frequency which were detrimental. He had himself carried out a considerable number of experiments on rays of a range of about 31 metres, and he had found indications, particularly with regard to bacteriophage, that these rays had some effect upon the activity of the parasite.

Differences in Immunity.

Dr. C. H. ANDREWES said that the impression left on his mind after the first meeting was that most of the speakers were of opinion that viruses might not be very different from bacteria, and that the immunity might be very much the same in both cases. He wanted, however, to take up the opposite point of view and to stress the differences in immunity as between bacteria and viruses affecting animals. In the first place, most virus diseases left behind them an immunity which was very definite or even absolute—absolute in the sense that it could not be broken down, as the immunity with most bacterial diseases could be broken down, by giving sufficiently large doses to the agent. The immunity was also very lasting, even apparently lifelong. Some workers suspected that this very lasting immunity might be associated with latent persistence of living virus in the animal. Again, it was not possible to immunize in general nor to evoke the production of antibodies against the virus by using heat-killed virus; on the other hand, it was possible to immunize and evoke the production of antibodies by inactivating the virus with such substances as phenol. But this failed to explain the rather remarkable fact that the production of antibodies with these killed viruses could only be effected by using an animal species naturally susceptible to the disease in question. Further, the serum of animals immune to virus disease contained certain antibodies which appeared to be different from other antibodies. In no case had it been shown that the antigen concerned in these reactions was the virus itself. The more characteristic antibodies associated with virus infections had these properties. If an immune serum was mixed with the virus in question and inoculated into a susceptible animal, the typical local or general infection exhibited on giving the virus alone, with no serum, did not develop. It had been assumed that the antibody had acted on or neutralized or perhaps killed the virus *in vitro*, but it did not follow that this obvious explanation was necessarily the correct one. The speaker described some experiments which had shaken his faith in the theory of the union of the virus and antibody *in vitro*. Further, some experiments at present in progress with vaccinia had indicated also that there was no evidence to be obtained at all readily of any union of the virus and the antibody in the circulation of the animal. If no union occurred outside the body nor in the circulation, one suspected that the essential protective action of the immune serum had to be sought for in the neighbourhood of the cell itself. Yet there were other experiments, again with vaccinia, which suggested that the protective action

of the immune serum did not occur if the virus had been allowed to get inside the cell beforehand. The virus was apparently able to multiply and flourish in the cell which was bathed by fluids containing the antibody. This made one wonder whether the protective action of the immune serum might not operate on the surface of the cell, preventing the virus from getting inside the cell and invading it. He believed there was enough evidence to indicate that the body's defence against a minute parasite such as a virus was probably a very different thing from its mode of protection against the larger bacteria.

Electrical Behaviour of Viruses.

Dr. S. R. DOUGLAS, director of the department of experimental pathology, National Institute for Medical Research, spoke on the electrical behaviour of these viruses. Previous to 1927, observations of the migration of the virus in the electrical field had given most discordant results, but during that year Dr. Todd of the National Institute devised an apparatus for working out these experiments. Using the bacteriophage of the Shiga dysentery bacillus, under different electrical conditions with various *p*H concentrations, the virus was found always to travel to the positive pole. In many of these virus diseases the blood had been found infective. Attempts had been made to discover in what portion of the blood the virus was situated. The history of these researches began with work on rinderpest, when it was found that blood which had been centrifuged and divided into two portions, one consisting of plasma and the other of cells, was free from all virus in the plasma, while the cells were highly infected. In 1914 Charles Todd, again working with rinderpest, found, not only that the plasma was not infective, but that the virus was contained almost entirely in the leucocytes; at least, the leucocytic layer contained one hundred times as much virus as the red cell layer. More recently, Wilson Smith, working in the speaker's laboratory with vaccinia, found that even after intravenous injection of the vaccinia virus into rabbits the plasma was infective for the first twenty-four hours, but that after that, up to the ninth or tenth day, the virus was confined entirely to the leucocytes, the red cells being free. In the later stages, from the fifth to the ninth day, although there was a considerable amount of virus present in the leucocytes, the plasma contained a large amount of antibody, which was completely able to mask the production of the lesion when the whole blood was injected.

Yellow Fever Virus.

Dr. EDWARD HINDLE spoke on the yellow fever virus, which, he said, was only moderately filterable. It passed through the coarser filters, and was arrested by the finer ones, but a very peculiar effect emerged from the filtration—namely, that the virus had a different size in the blood from what it had in the mosquito which transmitted the infection. This suggested that some form of evolution took place in the intermediate host. The virus in the mosquito was arrested by even the coarest kinds of filter. Another point which supported the view that the virus of yellow fever was a living organism was the undoubted variation in mortality in virus diseases. In epidemics of yellow fever variations ranging from a mortality of 10 per cent. up to one of 80 or 90 per cent. were found, and the speaker thought that this could be explained by assuming that the virus had similar variations to those found in plants and animals. The features of immunity in most of these animal virus diseases seemed to be distinct from the immunity in bacterial diseases. The very solid immunity obtained in the case of virus disease was a very peculiar thing. In yellow fever the inoculation of a presumably killed virus had produced an immunity in monkeys which, tested up to five and a half months, had shown no sign of diminution, and was continuing.

Dr. BRIERLEY of the Rothamsted Experimental Station said that one of the outstanding differences as between animal viruses and plant viruses was the weight which was placed by the pathologist upon filterability. The plant pathologist did not pay anything like as much attention to filterability as the animal pathologist. A great many plant viruses were not filterable at all, or, if they were, nothing was known about this property. Another striking feature of plant viruses was the way in which they existed in a large number of closely related strains which in nature were yet quite distinct. This had been shown by Dr. Kenneth Smith and others in this country. The extreme specificity of insect transmission in many plant viruses was also very striking. Certain insects would only carry certain viruses. He believed the virus to be some form of organism of the same order of life as bacteria.

Mr. J. E. BARNARD showed a few more slides illustrating the results of his work in ultra-violet microscopy. Among the examples shown were colonies of the virus of bovine pleuro-pneumonia. Photographed by ultra-violet light with dark ground, they appeared well differentiated, whereas in visible light, Mr. Barnard said, it would have been impossible to ascertain from the structure the type of organism. Mr. Barnard said that in his opinion there were at least two saprophytic viruses, probably non-pathogenic, which it was possible to grow and reproduce, though not with great regularity. Of viruses in general, he said that it appeared that these organisms could grow and reproduce themselves in the same way as the ordinary bacillus, but they could also revert to a form in which reproduction was, in his opinion, by an entirely different mechanism.

Is the Virus a Growth-promoting Substance?

Professor A. E. BOYCOTT, director of the pathological department, University College Hospital, who closed the discussion, took up the question of the ultimate origin of the viruses. What had struck him about these viruses was their likeness in behaviour to ordinary pathogenic bacteria. But wherein did the likeness consist? In certain superficial resemblances, in the fact that they multiplied (and anything that multiplied we called life), in the fact that they were easily destroyed by heat, which was also known to be destructive of living things, and also in the fact that they caused, like known bacteria, definite disease which could be transmitted from one individual to another. These were, of course, strong reasons—though all of them were on the ground of analogy—for saying that these organisms resembled bacteria. But several of the speakers had evinced a certain uneasiness as to whether these viruses did belong to the same order. There were many considerations which gave rise to doubt. Might not analogy be equally invoked to explain the viruses on the lines of growth-promoting substances? If one took a tissue culture and desired to grow it, one could stimulate it, generally for convenience with embryonic tissue, though it was not necessary that the tissue be embryonic; and by spreading it out, it was possible to grow a great deal more than one started with. In other words, there was a process of multiplication, not essentially different from what was found in, say, the virus of foot-and-mouth disease. This growth-promoting substance, which came into action, for example, immediately following a cut finger, was very similar in some respects to the virus, but no one would say that it was, in any sense of the word, life. The cancer virus differed essentially from the viruses causing epidemic disease, because what it brought about was a local disease belonging to an individual, and there again a form of multiplication occurred very similar to what happened in ordinary growth-promoting substance of normal tissue. With cancer virus, unlike viruses causing epidemic disease, it was possible to start at the beginning, experimentally. In the case of the virus of foot-and-mouth disease, or canine distemper, or measles, it was necessary to start with the disease in question, but in the case of cancer virus one need not necessarily start with the tumour. The tumour could be made to begin by irritating the tissues. It seemed to him that with these viruses analogy could be thrown whichever way was desired. It was analogy in either case, and analogy was all that was possible. Take it in one way, and the virus was like a bacillus; take it in another way, and it was more like a growth-promoting substance. At present it seemed impossible to find any criterion which would enable a distinction to be made between them.

TREATMENT OF TETANY.

AT a meeting of the Section of Therapeutics of the Royal Society of Medicine, on March 12th, with the president, Professor J. A. GUNN, in the chair, a preliminary communication on the treatment of chronic tetany with steatorrhoea in adults was presented by Dr. G. C. LINDER and Dr. C. F. HARRIS.

Dr. Linder dealt first with the different types of tetany, and called attention to some of the difficulties encountered in any accurate study of calcium and phosphorus metabolism. He pointed out that the association of tetany and fatty diarrhoea in children with coeliac disease and in adults with sprue had been recognized for many years. This study of three cases of chronic tetany with steatorrhoea in adults, one of whom had suffered from sprue, showed the calcium and phosphorus in the serum to be very much lower than the normal. The tetany was therefore allied chemically to that of rickets. Detailed determinations of the intake and excretion of calcium and phosphorus were made as frequently as possible, as well as observations on the serums, and Dr. Linder showed many charts illustrating the vast amount of work entailed. In the first case calcium chloride by the mouth proved a most effective agent for the relief of tetany and restoration of a normal concentration of calcium in the serum, but after a long period the occurrence of pains in various parts of the body called attention to the fact that decalcification of bone was occurring. This was attributed to neglect of the depression in serum inorganic phosphorus, which was deepened by the acid effect of the calcium salt. Subsequent treatment of this patient with calcium lactate, a high phosphorus diet, and irradiated ergosterol resulted in a positive balance of calcium and phosphorus and a rise of serum phosphorus to normal without fall in serum calcium or recurrence of tetany. The patient soon began to lose her pains, but it was four months before definite evidence of recalcification could be seen in skiagrams. The second patient was treated with radiostol from the beginning, and responded to it in a most satisfactory manner, both the calcium and the phosphorus in the serum becoming normal in two weeks. The beginning of the rise was accompanied by a threefold increase in the excretion of calcium and phosphorus, and this appeared to mean that the vitamin had caused these substances to be withdrawn in large amounts from their depots in the bones, and that the effective threshold for their excretion had been exceeded. This excessive excretion occurred only for the first week, although the level of calcium and phosphorus continued to rise in the serum, and the threshold must therefore have risen too. A fat-poor diet could not be expected to improve on the already satisfactory condition of the patient, but aided considerably in the improvement of her comfort and her state of general nutrition. She increased greatly in weight, the radiostol was discontinued after seven weeks, and no tendency to relapse had been noted in the past four months. The third case was one of sprue, and the patient reacted poorly to radiostol. Although there was some increase in calcium and phosphorus in the serum this was not maintained, and the tetany was unrelieved. The addition to the treatment of a strict fat-free diet was immediately effective in restoring normal serum chemistry and in relieving the tetany. From a consideration of the results of treatment and the metabolic data Dr. Linder formed the opinion that the condition of tetany was due, not to direct interference with the absorption of calcium and phosphorus, but rather to prolonged interference in fat absorption, leading to a deficiency of vitamin D. Treatment directed to the increased supply and better absorption of vitamin D appeared to be more promising than the administration of calcium salts.

Dr. DONALD HUNTER described a case very similar to those reported by Dr. Linder in which ergosterol was given, leading to a rise in the serum calcium and the disappearance of signs of latent tetany. In this form of treatment he thought it had been shown that calcium was drawn from the bones. He mentioned the occurrence of cataract in cases of post-operative tetany, and stated that, with the aid of the slit-lamp, he had found lens opacities present in the case he was investigating.

Dr. GEOFFREY EVANS emphasized the fact that the patients described by Dr. Linder had to be kept on a very strict fat-free diet, and he thought this form of treatment might be of great value in all cases of fatty diarrhoea.

Dr. J. TREVAN inquired if the patients were considered to be suffering primarily from vitamin D deficiency, and whether the decrease in fat intake had been shown to lead to an increase in fat absorption, which seemed to him to be the most remarkable feature of such cases.

The PRESIDENT said that a long time ago he had been puzzled by some of the problems of calcium absorption. He was struck in the present series of cases by the effect of comparatively short periods of administration of ergosterol. He inquired whether Dr. Linder had come to any conclusion as to what calcium salt ought to be included in the *Pharmacopoeia*, and what dosage ought to be recommended. Dr. LINDER replied to some of the points raised in the discussion.

THE FUTURE OF MATERNITY SERVICES.

THE Section of Obstetrics and Gynaecology of the Royal Society of Medicine joined with the Maternity and Child Welfare Group of the Society of Medical Officers of Health, on March 15th, for a discussion on the future of the maternity services. The chair was taken by Dr. J. S. FAIRBAIRN, president of the Section.

A Plea for a Specialist Obstetric Service.

Professor J. MUNRO KERR (Glasgow) recalled the achievements of the last decade, during which great advances had been made in maternal and infant welfare. The supervision of women during pregnancy had definitely lessened the incidence, and still more markedly the severity, of the obscure metabolic disturbances of that period; abnormalities in the position of the child, as well as other complications, could be anticipated, though, unfortunately, the number of women who sought medical advice during pregnancy was not so great as it should be. But the concern of the present discussion was with what Mr. Eardley Holland had called "the tactics of obstetrics," which, still being faulty, resulted in too many casualties. The chief reason was the difficulty of domestic practice. In most medical schools the undergraduate now received proper instruction in obstetrics, yet, even so, he could not leave his school as a perfect obstetrician any more than as a perfect surgeon, although the very day after he was qualified he might, as a locumtenent, be called upon to deal with a placenta praevia or some other serious complication. The public would not agree that such a man should perform a major surgical operation, but there was an idea that parturition was an uncomplicated process, which in very many instances it was not, and even in the simplest case there was a risk of septic infection. Furthermore, a large body of general practitioners did not wish to engage in obstetric practice, for which attitude he did not criticize or blame them, for general practice was as exacting as ever, and required a continually increasing knowledge of medicine. All he asked of general practitioners was that they should allow domestic practice to be so modified as to relieve them of this part of the work which so many found irksome. The reasons why domestic practice could not be satisfactory were:

1. The difficulty in securing surgical cleanliness.
2. The employment of midwives and nurses in domestic duties in addition to attendance on the women.
3. The difficulty of obtaining adequate assistance if operation was necessary.
4. The fact that midwifery practice disturbed the routine of a busy practitioner, so that he was tempted to expedite delivery unnecessarily or prematurely.
5. The fact that 60 to 70 per cent. of obstetric practice in the artisan class had passed into the hands of midwives, so that the general practitioner's opportunities for practice in the craft were limited.

The general practitioner, in his view, should be an expert physician, in close touch with the consultant, the clinical pathologist, and the health officer of the district, but he must no longer be a "jack of all trades." Preventive medicine depended most upon general practitioners, who detected disease in its beginnings, and they should not be worried by obstetric practice, but devote themselves more to pure medicine. It followed that some form of

obstetric service should be established, with a sufficient number of hospital beds to accommodate all primiparae, as well as those multiparae whose labour was likely to be complicated; multiparae in whom uncomplicated deliveries were likely might be attended in their own homes by trained midwives. In Glasgow, to provide beds for all primiparae would mean doubling the total available beds if each patient was to be kept in hospital for ten days; but the speaker thought that many of the women could be taken to hospital by ambulance at the commencement of labour, and after three or four days be similarly taken home without risk. This service, at least in all large centres, should be delegated to obstetric specialists, who would also supervise the work of the midwives, and thus keep them up to the standard inculcated in their training. But even with the best system there would necessarily be an irreducible minimum of casualties; puerperal infection could never be absolutely stamped out.

The Role of the Public Health Officer.

Dr. J. J. BUCHAN (M.O.H., Bradford) was unable to go so far as Professor Munro Kerr in seeing a vista of obstetric specialists conducting routine midwifery practice in this country. Professor Kerr's view of the general practitioner in this branch of medicine ran counter to his own. Dr. Buchan regarded the general practitioner as a potent force in public health—the outlying scout who detected early defects and errors. It would be a calamity from more than one point of view if the general practitioner were divorced from midwifery. The dangers of child-bearing were due to three causes, in order of importance: (1) the unfitness of the woman, owing to defects in health or physical development, to undergo the ordeal safely; (2) want of knowledge and failure to seek advice and help on the part of the pregnant woman; and (3) want of facilities for advice and treatment. Maternity work was no longer regarded as the service given by experts from the onset of labour to the end of the lying-in period; the medical profession and the public were slowly becoming conscious of the need of supervision throughout pregnancy, and in the future more attention would be paid in general to the correction of errors in young women which were likely to interfere with normal function. There would be more study of the physiology of the female. The causes of difficult maternity were to be found in very many cases quite early in life, and could be prevented or mitigated long before any question of maternity itself arose. There were, of course, other defects and diseases which appeared later, and were liable to endanger life during child-bearing. How far a woman suffering from nephritis should undertake the risk of maternity was a matter which only the most skilled opinion could determine in each case. To check and prevent such occurrences would seem to demand a procedure of health examination and certification before marriage, an end scarcely likely to be attained within a reasonable time. One practical possibility which might lead to a diminution in maternal mortality was a development of the National Health Insurance Act whereby maternity benefit would be administered, not in cash, but in the form of beds in a maternity service. The midwife, in Dr. Buchan's view, was essentially a health officer; her duties were to observe and supervise the normal. In the care and treatment of abnormalities in any form her duty as an independent practitioner ceased with their detection; her duty then became that of a nurse working under the direction of a medical practitioner. Even the general practitioner should regard his duty primarily as hygienic and preventive. To an increasing extent he was engaged only for abnormal midwifery, with the result that he tended to regard all midwifery as abnormal. Progress in maternity work would be attained by the development of the work of the midwife and the practitioner in preventing physiological abnormality, rather than in seeking the successful treatment of it once it arose. Nevertheless, no scheme could be regarded as efficient in which the fullest use was not made of the obstetric specialist. The ideal would be for the specialist to see every patient in the course of pregnancy and in the early stage of labour. The obstetric specialist must be a real part of the service, linking up the other parts. Unhappily, in all branches of medicine, the really critical diagnosis—the first diagnosis—was often made by the people who were less skilled, in the out-patient department, for example, while the skilled man came later to correct the diagnosis, and perhaps perform the operation.

The Creation of a Maternity Tradition.

Mr. EARDLEY HOLLAND thought that Professor Munro Kerr's views might be realized in the far future; in the meantime one had to depend on the general practitioner and the midwife to do the bulk of maternity work, though institutional midwifery was increasing, and would increase. A criterion of the efficiency of a maternity service was the maternal mortality rate. This rate, obstinately high, indicated that the service was not a good one. Obstetricians understood the reason well enough, but they could not convert to their views the responsible heads of medical thought and education in this country, nor those responsible for public health. The standard of maternity service in any country depended essentially on a tradition, and in this country a great maternity tradition did not exist. This was not the fault of the professional obstetricians, who had been putting up a great fight for years, and had overcome a great deal of opposition. They had persuaded the General Medical Council to impose a certain minimum period which students must spend in the maternity wards; they had secured an increase in the duration of training of midwives from six months to one year; they had caused the institution under the Conjoint Board of a clinical examination in obstetrics and gynaecology; they had brought about the creation of maternity wards in several of the medical schools of London. Public health authorities had also been active during the post-war period. They had issued many eloquent reports, arousing, and even frightening, public opinion; they had established a large number of ante-natal clinics; they had caused important Acts of Parliament to be placed on the statute-book; they had appointed committees to consider various aspects of the question, had instituted inquiries by medical officers of health into all cases of death in childbirth, and had made new regulations for the notification of puerperal pyrexia. That was a fine record, but what had been the result of the activity? The maternal mortality rate refused perversely to diminish. The speaker's criticism of the maternity policy at present pursued by the Ministry was that the Ministry had tackled the problem in the wrong way, and had failed to go to the root. The Ministry had no direct power to reform medical education or to spend large sums of money in building new maternity hospitals and training schools. But the Ministry had not paid enough attention to the views put forward by the obstetricians. The money and man-power at present expended in minor and ineffective measures—ineffective because they did not lower the mortality rate—would give a better return if spent in supporting the reforms urged by the Royal Society of Medicine Committee in 1919 with regard to teaching. The salvation of the position would be large maternity hospitals with attached training schools of university standard staffed by resident experts. If these were established in the right centres the true maternity tradition would be created, first in the medical profession, from which it would spread to the general public. These large hospitals and training schools would not only afford every medical student and midwife an adequate training in midwifery, but they would train the young obstetric expert or specialist, who in this country at present had but small opportunity of receiving training. Mr. Holland went on to urge what he called the three-division principle for all maternity hospitals: a large division for the "clean" cases, a smaller division for emergency cases—cases of ante-partum haemorrhage, and difficult labour of any nature, every one of which was potentially a case of puerperal infection—and, the smallest division of all, for frankly septic cases which arose in hospital. A great deal of puerperal infection in small maternity homes and hospitals was due to the mixing up of the emergency cases in the labour wards and maternity wards with the "clean" cases, cross-infection occurring before the attendants had any warning that a particular case was really infective. The speaker ended with a criticism of ante-natal clinics. The country had "gone mad" on ante-natal work, which had been given an exaggerated importance. He was sure that far more women died from lack of attention during

labour than from lack of care during the ante-natal period. A great deal of ante-natal work, especially municipal, was in his opinion utterly irresponsible, simply because the doctor or person in charge of the patient at the ante-natal clinic during pregnancy was not responsible for her care during labour.

The Position of Midwives.

Dr. EUSTACE HILL (M.O.H., co. Durham) said that his own impression, contrary to what Professor Munro Kerr had suggested, was that the newly qualified practitioner was very keen on taking up midwifery, and this had even led to a certain amount of feeling against the midwife. Professor Kerr's suggestion that midwifery practice should be placed in the hands of expert obstetricians would not be popular among practitioners, at least in many parts of the country. Many obstetric consultants were apt to take too narrow a view of the problem, visualizing it only as applied to large towns, with the provision of maternity hospitals and homes. But in the West Riding, Durham, and Northumberland, to speak only of his own part of the country, there were large areas where it would be impossible, even with motor-car provision, to get any specialist to a case before the need for him was over. He could not agree with Mr. Eardley Holland's criticism of ante-natal clinics. Truly they were in their infancy, many were imperfectly staffed and conducted, and the essential co-operation between the clinic officer and the general practitioner was lacking; but nobody could deny that a proper ante-natal service must be of great value to the community. Large maternity hospitals were desirable, but they would not solve the problem of the urgent case in the remote district. In his own county quite 20 or 25 per cent. of the cases booked for admission to maternity hospitals or homes could not get there before the event was over. In the midwife he was a firm believer, and he was anxious that her status and remuneration should be improved. Her position in scattered districts was one of exceptional difficulty because there were not enough midwifery cases to enable her to make a living. He had looked with anxiety upon the combination of the duties of midwife and ordinary nurse, but he was bound to say that he had found no definite evidence of a tendency to sepsis in midwifery cases attended by a midwife who had been doing nursing duty. The elimination of the handywoman was very important, and one thing which would tell in that direction would be a requirement that every woman eligible for maternity benefit should engage either a properly qualified midwife or a doctor.

Education in Obstetrics.

Lady BARRETT said that probably all obstetricians were convinced that maternity work in hospitals was quite the best type of work done, but she hoped it would not be forgotten that the whole matter was at present in an intermediate stage, and, frankly, she did not think they were quite in a position to define the share to be taken by the general practitioner in obstetric work; at the moment this was very considerable. A few measures might be adopted to enable him to do his work with very much greater facility and satisfaction to himself. She suggested that every patient should have a qualified midwife even though a doctor was in attendance, because it was quite impossible for a busy general practitioner to give the time that the best midwifery required. She could not help thinking that it would be possible to enable these highly trained women to give anaesthetics in the second stage or, at any rate, in the later part when the doctor was present. Although Mr. Holland had spoken in congratulatory terms about the better education of the medical student, yet, even in the schools which gave the longest training, only three months were entirely devoted to midwifery, or six months to midwifery and gynaecology, and the recipient of this training on setting up in practice was supposed to be called in by a midwife who had spent a whole year of training in nothing but midwifery. The standard of education was still decidedly too low.

Dame LOUISE MCILROY thought that the general practitioner ought to conduct the ante-natal examination, and the midwife ought to co-operate with him in the care of the patient. She thought that ante-natal clinics might be run by a panel of general practitioners who had shown interest in and aptitude for midwifery; this would be specially useful in country districts. Mr. Holland had been a little too critical of the public health service. After all, it was only the people responsible for that service, apart from the teachers, who had advanced obstetrics, and obstetricians had until recently stood aloof in questions of administration. Obstetricians were inclined to be unfair in their criticism of the general practitioner; what had they done for his instruction? There were post-certificate classes for midwives, but she was not aware of any post-graduate facilities for the general practitioner, enabling him to take an intensive course. The general standard of teaching ought to be raised; at present the practical teaching was largely given by house-surgeons and juniors in the wards.

Dr. W. S. A. GRIFFITH said that the crux of the problem was the better education of the general practitioner and of the midwife. Within the last twelve months he had read two reports in the *British Medical Journal*, both emanating from Scotland, recounting a series of disasters so terrible that they could only have been the result of a state of ignorance almost inconceivable on the part of those responsible for them. More facilities for teaching were very necessary.

The General Practitioner Defended.

Dr. F. W. H. OXLEY (Poplar) declared that the obstetric specialists of the country were really the general practitioners. Professor Munro Kerr was trying to remove the general practitioner out of practical midwifery. The speaker narrated some of the things which general practitioners had done in this sphere. It was a general practitioner practising in Huddersfield in the later years of the last century who introduced diagnosis by abdominal palpation, and insisted that it was only rarely necessary for the woman to be examined vaginally. It was a general practitioner in the East End of London in the middle eighties who was the first to introduce into this country ante-natal work on a large scale. Another general practitioner, practising in a small country village, was the first to draw the attention of the profession to the very great danger that puerperal fever might be carried through droplet infection from cases of septic industrial accident. While the general practitioners were doing all this, nothing whatever of practical effect was being done by the professional obstetricians, and it required the Chief Medical Officer to the Ministry of Health to wake them up to take an interest in this state of affairs. He thought it only due to a large body of men doing excellent work, often under the most dreadful conditions, to say so much in their defence. On the general question he looked to developments of the maternity service under the National Health Insurance Act. The number of institutional beds needed, he thought, had been exaggerated. Moreover, there was a great danger of infection to healthy patients on going into institutions, so much so that in Aberdeen the death rate in the midwives' cases was only 2 per 1,000, whereas in hospital it was 14 per 1,000; the difference was put down almost entirely to this factor of infection.

Dr. STELLA CHURCHILL, speaking with regard to the domiciliary treatment of midwifery cases, said that she personally would regret very much to see the extension of the Insurance Act to dependants from this point of view so long as the general practitioner had not received an adequate training in midwifery, for the results were not likely to be much better than they were to-day.

Maternity Hospital Administration.

Sir EWEN MACLEAN (President of the British Medical Association) said it was common ground that better facilities were needed for the training of the medical student. Those at present concerned in teaching had gone through many trials and tribulations in order to secure that degree of betterment which did at present exist in the maternity services of the country. There was a tendency to bring railing accusations against the profession as a whole, and it was not appreciated what difficulties a number of them had encountered in their generation over this matter in securing a reasonable number of beds for tuition. It had been stated that the number of additional

beds required for a maternity service to cover the country would be not less than 50,000. But the mere fact of having a maternity hospital, large or small, was not sufficient in itself; a great deal depended upon the way in which the hospital was run and staffed. He was convinced that the ideal method was that in practice at Cardiff at the present moment; there were 31 maternity beds in the Royal Infirmary in direct association with the ante-natal clinics of the local authority. The principal ante-natal clinic, indeed, was situated in a portion of the maternity hospital itself. The association with the general hospital was very advantageous, because its general or special departments were available for service when required. The speaker believed that the first material contribution to a system for dealing with midwifery cases in general would come through the development of the national insurance system, still practically only at its commencement. The proposals made in this connexion by the British Medical Association in its evidence to the Royal Commission were at least worthy of very careful consideration. He was sure that no obstetric specialist had intended his words to express anything inimical to the general practitioner, who was, indeed, the first line of defence, and without whom no ideal system of midwifery service could be reached.

The CHAIRMAN (Dr. Fairbairn) recommended both Dame Louise McIlroy and Dr. Oxley to peruse the *Proceedings* of the old Obstetrical Society and the present Section, from which they would find that nearly all the recent reforms had been foreshadowed by the obstetricians, although, of course, they could do nothing until the authorities took up the matter. He added that he thought there was one unmentioned factor which assisted in the maintenance of maternal mortality. Under the present social conditions the mental attitude of women towards child-bearing had been widely affected. They shrank from what it might involve in the way of pain and suffering, and demanded anaesthetics and a quick termination of labour. The medical attendant at a confinement had pressure brought to bear upon him to this end, not only by the patient herself, but by the husband and friends; such pressure was difficult to resist in a domiciliary case, though easier in a maternity home or hospital.

Professor MUNRO KERR, replying, said that Dr. Oxley, although he claimed the title, was not a general practitioner: he was an obstetric specialist in general practice. Dr. Oxley had asked what contributions obstetricians had made. The speaker would remind him that two of the greatest contributions to practical medicine were made by obstetricians—namely, by Semmelweis, with whom originated the scientific pathology of septicaemia, and by Simpson, who was the first to employ anaesthetics in obstetric practice. Dr. EUSTACE HILL, who also replied, paid a tribute to the general practitioner, the best type of whom, he thought, was found in scattered country districts. The country practitioner was a most able and accomplished man, quite capable of doing much which in the town would be referred to the expert.

CHRONIC METRITIS.

AT a meeting of the Section of Obstetrics of the Royal Academy of Medicine in Ireland on January 25th, with Sir WILLIAM SMYLY (in the absence of the president) in the chair, Dr. D. J. CANNON showed a specimen of chronic metritis.

Dr. Cannon said that chronic metritis, like chronic endometritis, was a relatively rare condition. The majority of cases of so-called chronic metritis were in reality instances of chronic subinvolution, as had been shown by the researches of Goodall and others.

The patient, a nulliparous woman, aged 36, had been operated upon for double pyosalpinx about four years previously. On account of the healthy condition of the cervix a Sturmdorf operation was first of all performed, and afterwards both tubes and ovaries had been removed. The uterus was elevated by suturing the round ligaments to its back. As a result of the operation the patient was relieved of all her symptoms except a mucopurulent discharge. About six months before the meeting the patient had returned to Dr. Cannon on account of this discharge, which gave rise to a most annoying eczema and general ill health. She looked anaemic and debilitated. Dr. Cannon performed a complete hysterectomy, and the patient was now restored to health.

The following pathological report had been received on the specimen. "This specimen consists of a small uterus without tubes or ovaries, also a small piece of separate tissue. Sections cut from the small fragment show it to be derived from the cervix. It is composed of fibro-muscular tissue with a partial covering of stratified squamous epithelium. At one point the epithelium is slightly broken, and here there is an area of infiltration with chronic inflammatory cells, plasma cells, and mononuclears. There are a few dilated blood vessels in the body of the section. On cutting into the uterus the mucous lining is somewhat swollen, and the muscular structure shows many small red points. Microscopical sections taken through the wall, including the mucous membrane on both sides of the lumen, show the muscular layer to be in a state of fibrosis and containing many thick-walled blood vessels. The mucous membrane is atrophic, and although glandular acini are present, they are not numerous. There is no evidence of tubercle or malignant disease. The specimen appears to be a fibrotic uterus."

Dr. Cannon said he thought that this case was also interesting from the point of view of the treatment of pelvic infection. As a rule conservative radical treatment, rather than complete hysterectomy, was the treatment of choice. Should there be chronic endocervicitis, some operation should be performed on the cervix as part of the conservative radical treatment. Treatment along these lines helped to cure the discharge in the majority of cases, and this gave clinical support to the view that a vaginal discharge usually had its origin in the cervix, and not in the body of the uterus. Dr. Cannon thought that the pathological report explained the failure of conservative radical treatment in this case.

Sir WILLIAM SMYLY asked if the uterus had shrunk since the tubes had been removed. He did not think that pathologically there was any difference between chronic metritis and fibrosis uteri. Dr. J. S. QUIN referred to the fact that at the time of the second operation the patient's chief symptom was profuse leucorrhoea. This produced symptoms of very great discomfort, and was often very difficult to deal with. He congratulated Dr. Cannon on his success in curing it in this case of hysterectomy, since very often it was not cured by this operation. He asked if the discharge had been bacteriologically examined. Dr. F. W. DOYLE stated that this patient had a tuberculous history, and some years before her marriage had had bone tuberculosis. He had been present at both operations; at the first the case seemed to be one of tuberculous tubes, and on the second occasion there seemed to be a mixed infection.

Dr. CANNON, replying, said that the uterus had shrunk since the removal of the tubes. When he first examined the patient he had suspected tuberculous tubes, but after the operation no tuberculosis had been found. He had not considered radium treatment, since he believed it had been stated that radium should not be used in true cases of chronic metritis where there was a discharge as well as haemorrhage. The discharge, which was muco-purulent, had been examined, but no gonococci had been found.

Sequels of Radium Treatment.

Dr. BETHEL SOLOMONS showed a uterus which he had removed by the Wertheim method from a multipara, aged 57. Regular menstruation had ceased for four years, but a year ago she started to bleed irregularly. On examination there was found a typical squamous cancer of the cervix, which bled easily on examination, and seemed fixed to all the fornices. It was a borderline but somewhat dangerous operative risk. Radium was inserted by Dr. Stevenson, and she was closely watched for four months. Gradually the appearance became nearly normal, but as she had two haemorrhages during that time, he decided to remove the uterus. A microscopical report stated that the glands showed no abnormality; there was no evidence of malignancy, and the muscle walls revealed much hyaline change. There was no excessive fibrous tissue during the operation, but the left ureter was slightly out of its usual position. Recovery was uneventful.

Dr. W. C. STEVENSON, who had given the radium treatment, said that the dose in this case was rather larger than usual, because it had been applied in more than one place. If it had all been given in one site that area would probably have been destroyed altogether. He had begun treatment on October 2nd, and continued it for three days; on the fourth day the patient had taken some bovril, after which severe diarrhoea followed. Dr. Stevenson had used 49 millicuries of radium, and had kept the

radium as far away from the rectum as possible. The cavity of the uterus was 7 cm. long; the radium tube was left for twenty-four hours, and was then pulled down a further two centimetres and left for another twenty-four hours, at which time it was just at the cervix.

Dr. W. A. TAYLOR said that the sequence of events after radium treatment which was described in textbooks had not occurred in this case. The stage of hyperaemia had appeared when the patient had suffered from diarrhoea, but there had apparently been no stage of sloughing, since nothing in the nature of a slough had come away. After the diarrhoea ceased, the condition of the cervix very rapidly improved, and, in fact, it appeared to have healed. This case, he thought, brought to notice the position of radium in the treatment of carcinoma of the cervix at the present time. These cases were classified in the literature as operable, borderline, and non-operable cases. He personally believed that radium removed the borderline cases, since all surgeons now decided to see what radium would do for these patients before operating. The question of giving this patient a further course of radium had been considered, but she had passed from a condition of parametric involvement to one in which no such involvement could be found, and so it appeared that the time for operation had come.

Dr. D. G. MADILL stated that in this case he would have removed the uterus. He thought that a few years ago the dose of radium applied by Dr. Stevenson had been considerably smaller than he now employed. He asked how many needles had been used, where they had been inserted, and whether in some cases needles should be inserted and left in for about six days without being disturbed, as recommended by Dr. Webster.

Dr. A. H. DAVIDSON asked if Dr. Solomons had experienced any difficulty in performing the operation, since it was generally supposed that after radium treatment much fibrous tissue formed and made the Wertheim operation difficult. He thought it possible that the haemorrhages were of fibrotic origin, and wondered whether the radium treatment would not have been sufficient, and whether the operation was necessary and would do good. Radium affected mostly the nearer cancer cells, and not the deeper ones; if in the present case it had killed the more distant cells no operation would have been necessary.

Dr. R. STUMPF said that there were three ways of treating cases like that of Dr. Solomons—namely, radium, deep *x*-ray therapy, or combined treatment by *x* rays and radium. According to recent statistics, the results obtained from each of these were about the same. At a recent meeting of radiologists it had been stated that radiotherapy was as effective in operable cases as was surgical operation. In borderline cases, cure by radiotherapy could be obtained in from about 10 to 15 per cent. Considering that the operative technique in these cases could hardly be improved, and that radiotherapy was only in the early stages, he thought it likely that the time might come when surgical operation would be abolished even in operable cases and all be treated by radium.

Dr. STEVENSON, replying, said that it was sometimes difficult to know how long to wait after radium treatment before operating in these cases. In the present instance, the treatment had been very intense, and the operation had been performed nine and a half weeks afterwards; he thought that this was about the right time to wait. He had not used needles, but had employed the screen method, by which it was possible to supply a much more diffuse dose, and one which was more likely to affect the parametrium. He thought that leaving in the needles for six days would result in giving a very good dose, though he had at present a patient in whom he thought he would leave them for fifteen days.

Anaesthesia in Labour.

Dr. J. S. QUIN read a paper on scopolamine-morphine narcosis in labour; he first described the method used by the Freiburg school and then detailed the method adopted by himself. He considered it important that the first injection should be given to the patient as soon as labour had started, and a further injection after the child was born. In 25 per cent. of the patients treated the result was very good, in 15 per cent. the result was good, and in 10 per cent. there was no apparent benefit from the treatment.

Dr. D. G. MADILL said it had been stated that after the judicious use of scopolamine-morphine the patient would fall asleep, and labour would pass without the patient remembering much, if anything, about it. His experience was that scopolamine-morphine had not been so successful as this. He noticed that Dr. Quin, out of sixty-one cases, only regarded fifteen as complete successes. Dr. Madill attributed failure in some cases to want of complete silence in the patient's surroundings. In his opinion scopolamine-morphine was not the ideal anaesthetic in obstetrics, and he thought there were great possibilities in rectal ether administration.

Dr. BETHEL SOLOMONS said he did not advocate twilight sleep as a general measure; he thought it should certainly be given to the primigravida who dreaded childbirth, and to the multipara who had had a severe time during her first confinement, and who looked forward with fear to the second. There was no doubt that the method was not ideal, and that "blue" babies were often born. The room should never be darkened, for it was necessary that the nurse should have a good view of the patient. Much harm had been done by advocacy of the method in the lay press, and the establishment of twilight sleep homes, where the doctor in charge was not always a specialist in obstetrics. He believed that the ideal anaesthetic in labour had not yet been obtained.

Dr. F. W. DOYLE referred to a gas-oxygen apparatus which had recently been installed at the Coombe Hospital, and said that this method was now being used in America, and, according to the literature, with extremely good results. Gas-oxygen could be given with perfect safety to both mother and child, and did not interfere at all with the progress of labour. It was claimed, indeed, that it accelerated rather than retarded its progress, and it did not cause any interference with lactation.

Dr. A. H. DAVIDSON thought the great disadvantage of scopolamine-morphine narcosis was the supervision which was necessary. It would not be easy for a busy obstetrician to visit a patient every three hours, but if the nurse could be sufficiently trained to give the injection and to see that the patient did not come to any harm from it, it would be a different matter.

Sir WILLIAM SMYLY, referring to the rules laid down for the beginning of scopolamine-morphine injections, thought that the right time to begin the injection was when labour became painful; treatment should be confined to the first stage of labour. Most patients in private practice insisted on receiving some kind of injection, but scopolamine-morphine was certainly not the ideal treatment; it eased patients, however, and helped them greatly in the first stage. Its great drawback was the uncertainty of the result.

THE DIAGNOSIS OF ACHONDROPLASIA.

AT a meeting of the Devon and Exeter Medico-Chirurgical Society at the Royal Devon and Exeter Hospital, on February 28th, with Dr. F. A. ROPER in the chair, Dr. A. L. CROCKFORD showed a girl, aged 1 year 11 months, the subject of achondroplasia. Dr. Crockford said that at first the possibility of thyroid deficiency had been borne in mind, but the mental development and normal articulation in the absence of the natural fullness over the thyroid gland had negatived this alternative diagnosis, made when the infant was aged 6 months. There had been protuberance of the tongue from the earliest days; the typical shaped head, with depressed bridge of the nose, was present, and the lack of parallelism in the fingers resulting in the so-called "trident" hands was of diagnostic significance. An interesting feature of the case was the occurrence of superimposed post-natal rickets, as evidenced by a rickety rosary, and the outward and forward bowing of the femoral bones and tibiae. The treatment employed had been directed to the true (post-natal) rickets, and included cod-liver oil and attention to the diet. Dr. Crockford added that he had been unable to find anything adverse in the family history suggesting a predisposing cause, nor

was there any history of the occurrence of this condition in relatives.

Dr. FAYLE SEALE, commenting on the case, said that achondroplasia and rickets were diametrically opposed from the pathological point of view, in that achondroplasia resulted in premature ossification, while rickets held normal ossification in restraint.

Etiology of Localized Oedema.

Dr. R. N. CRAIG showed a woman, aged 50, who had developed bilateral oedema of the eyelids following an attack of erysipelas. There had been pyrexia during the infective stage of ten days, and then an apparently quiet interval. The swelling of the face recurred, and, in turn, disappeared for four weeks. There had followed the present oedema of the lids, which had remained constant for the past three months. There was considerable swelling below the orbit on each side, and the wearing of spectacles was rendered very difficult on account of the deep pitting set up by their pressure. All protein tests had proved negative. An angioneurotic origin had been considered when the case was first seen. No treatment appeared to benefit the condition, the calcium group of salts being among remedies given a trial.

Dr. W. A. DATE said he had found thyroid extract useful in similar conditions, but Dr. JACKSON thought that the history of infection and the subsequent progress of the case pointed to obstruction of the lymphatics. Mr. NORMAN LOCK mentioned that he had known a similar state of localized oedema to follow a cat-bite.

Treatment of Diabetic Coma.

Dr. F. A. ROPER showed a young man, aged 20, who was just recovering from diabetic coma.

The patient had been admitted to the Royal Devon and Exeter Hospital on February 25th, drowsy, with marked air hunger, patches of cyanosis all over the body, a poor, rapid pulse, and a strong smell of acetone in the breath. He had been under treatment for diabetes for five years, and had been taking 60 units of insulin and following a diet of nine "lines." Two days before admission he had bicycled about twenty-five miles, the temperature on that day being well below freezing point. In the evening he felt ill, and had subsequently had no inclination for food up to the time of admission, but had complained much of thirst. On admission he was noted to be a well-nourished, muscular young man, and to be in a state bordering on coma, with a considerable quantity of urea and acetone in the urine; the blood sugar figure at that time was 0.312. An injection of 30 units of insulin was given at once, and the dose was repeated for three consecutive hours. The same dose was repeated in four hours, followed by 20 units four hours subsequently, until, at 8 p.m. (fifteen hours after admission), a total of 110 units had been injected. At this period the urine was found to be free from glucose. Any attempt at natural feeding was frustated by vomiting at this juncture, and glucose was given by injection only. Since the time of admission there had been several periods when collapse seemed to be imminent, and stimulation had to be effected with brandy, camphor in oil, and digitaline. From midnight up to 3 a.m. on February 26th the progress was more hopeful, but half an hour later the patient was again on the verge of coma. A catheter passed at this time withdrew only 5 oz., the urine being loaded with glucose and acetone. The insulin treatment was renewed energetically, together with glucose injections. At 7.30 a.m. he had sufficiently recovered to take a beaten-up egg and half a pint of milk by the mouth. Improvement was maintained up to 9 p.m. on February 26th, when the patient was found to be sugar-free, but at 1.45 the next morning there was a further relapse, with a return of the glycosuria and acetonuria. At 8 a.m. he showed distinct improvement, 50 units of insulin having been injected during the period of relapse. From this time onward there had been progress, and the cessation of vomiting had permitted a definite diet to be given of 950 calories in the twelve hours, during which 85 units of insulin were administered, the urine remaining sugar-free all the time. When shown to the meeting the patient was conscious, and was practically sugar-free; 20 units of insulin were being given at three-hourly intervals, with 2 drachms of glucose. Feeding ranged from one and a half to two "lines," and had included grape fruit and chicken broth.

Dr. R. A. P. GRAY, who had kept very full notes of the case during the critical periods, gave a detailed account of the three days' continuous combat with coma. He said that success, at any rate temporary, appeared to be probable as a result of the energetic treatment employed. Dr. W. A. DATE, who had attended the patient for some five years, described him as active and athletic, but one who was difficult to maintain on a diet sufficient for his natural requirements. Dr. Date had never known the urine to be entirely free from acetone in this case.

Diagnosis of Still's Disease.

Mr. NORMAN LOCK showed a boy, aged 7, with arthritis of the rheumatoid type. He said that, when first seen early in 1927, there was limitation of movement, and pain, in the left hip. A diagnosis of tuberculosis had been suggested in the first instance, but subsequently the right knee, and later still the left knee, became involved with effusion into, and thickening about, the joints. Treatment had been general, with splinting to prevent deformities, and also three doses of thiosinamine. There had been some slight rise of temperature for nearly two years, but the range was within the normal limits now, and the joints were moving well. Mr. Lock said that, in spite of there being no accompanying splenic enlargement with the arthritis, the true diagnosis was Still's disease.

Dr. T. R. C. WHIPHAM recounted a somewhat similar condition in a boy under his own care several years ago; in this case, however, there had been definite enlargement of the spleen and lymphatic glands. There were several remissions during the observation and treatment, which had been continued for three years. A short-circuiting operation was performed for "colon cut-out." Three weeks after the operation Dr. Whipham had been astonished to find the boy up and about, and able to run down the road. Unfortunately this improvement was only maintained for six months, when the symptoms recurred, and steady deterioration ensued, the boy eventually succumbing to the affection.

ACTION OF LEAD ON THE TISSUES.

AT a pathological meeting of the Liverpool Medical Institution, on February 17th, Dr. M. DATNOW read a paper on the effects of lead on the tissues. After a brief historical review of lead poisoning, Dr. Datnow gave an account of experimental work carried on for the Liverpool Medical Research Organization. The animal employed was the rabbit, and the chief lead preparations used were the phosphate, aspartate, glutamate, hippurate, malate, iodobenzoate, and the benzoyl aspartate, in colloidal suspension containing 0.5 per cent. Pb. The lead colloid was introduced by intravenous injection. Dr. Datnow said that as the liver, with the possible exception of the spleen, was the main organ concerned in taking up lead from the blood stream, it was also the organ which first showed pathological changes. With massive doses, or with very toxic preparations such as 10 c.cm. of lead malate, or 5 c.cm. of the more toxic benzoyl aspartate, extensive haemorrhage was found throughout the liver substance. With therapeutic doses there was only transient cloudy swelling, which cleared up in twenty-four hours. This was confirmed by liver function tests and by clinical observations. Intermediate doses produced extreme dilatation of the capillaries, with compression of the liver cells; the zone of the central vein was first affected. Similar changes were observed in the kidney. In the heart muscle, apart from haemorrhages with lethal doses, no definite pathological changes were found. The spleen showed increased pigment, with dilatation and congestion of the sinuses. Dr. Datnow also briefly mentioned the selective choriotropic effect of lead first pointed out by Blair Bell. He concluded by describing the effects of lead on rat tumours (Flexner rat carcinoma and sarcoma), demonstrating the destruction of the malignant cells, with increased fibrosis in the tumours, after treatment with lead aspartate. The paper was illustrated by a large number of lantern slides.

AT a meeting of the Brighton and Sussex Medico-Chirurgical Society, held on March 7th, with the president, Mr. GEOFFREY BATE, in the chair, Sir ROBERT JONES, Bt., gave an address entitled "The problem of fractures," in the course of which he dealt particularly with fractures of the head and neck of the femur, and those at the ankle, wrist, and lower end of the humerus. He paid special attention to practical points in diagnosis, and indicated the best methods of treatment, illustrating his remarks with demonstrations on a living subject. He insisted on the necessity for early reduction of recent fractures, and for patience in after-treatment, giving many valuable hints for dealing with various cases.

Reviews.

FRACTURES.

THE first edition of Dr. KELLOGG SPEED'S *Text-Book of Fractures and Dislocations*[1] showed him to be as competent a teacher as he is a surgeon. The second edition, of which the text has been entirely rewritten, may be considered almost as a new book. In the days before 1914 compound fractures were rare, but mechanically propelled vehicles on the open roads of every country have produced a great increase in the number of cases of compound fractures of the most serious and extensive kinds, very often infected from the first. Tetanus and gas gangrene were rare—at any rate in this country—before the war, but now it is found necessary, or at least prudent, to give injections of antitetanic serum after road accidents, and to be always on the alert for the early stages of gas gangrene. Naturally, therefore, on examining such a book as this we turn our attention first to the chapter on the operative treatment of fractures, in which the treatment of compound fracture is discussed. The advice Dr. Speed gives on this subject is very sound, and should be taken to heart by every surgeon who finds himself in charge of a compound fracture. The main points insisted on are: the desirability of treating all compound fractures as if they were infected; débridement, or, as the author prefers to call it, épluchage of the wound, including, of course, the skin edge and projecting bone; the need for avoiding or exercising great care in the use of tourniquets; and the value of drenching of the part with an accepted antiseptic solution.

The paragraph headed "What not to do for open fracture" is equally important. "No attempts at reduction, removal of foreign material, picking at the wound, sticking instruments or fingers into the wound, should be made in the first aid." This rule needs emphasis, particularly in the instruction of Red Cross and St. John detachments, for the ardent amateur is much more likely than the practitioner to be led away by his wish to "do something." For shock no alcohol is to be used. The best first-aid treatment of this condition is by warmth, recumbency, and morphine. The author's remarks on the indications for primary amputation are very sound. In the account of the technique of épluchage we find no reference to bipp as used by its inventor, Rutherford Morison.

As for skeletal or direct traction, Dr. Speed gives the following warnings limiting its application: the nail or wire or tongs must not (early) pass through the haematoma of the fracture, the epiphyseal plane, or a joint; it must not split the bone or pass just under the periosteum, where it will cause pain; no foreign material, such as plates, screws, or nails, should be put on the wounds of open fractures. These "don'ts" are of great value, and we quote them to show the author's clarity of expression and the practical nature of his advice. In a very interesting and full discussion of recurrent dislocation of the shoulder and its treatment we find no mention of the important paper by Mr. A. S. Blundell Bankart which appeared in our columns on December 15th, 1923 (p. 1132). It is not evident what method of treatment the author prefers. In the illustrations of flexion treatment of supracondylar fracture of the humerus in the young we think that the angle of flexion is dangerously acute, and must increase the risk of that terror of the fracture surgeon—Volkmann's ischaemic contracture. On this last subject we think that Dr. Speed's estimate of the success of operative treatment is optimistic. Those too often permanently disabling conditions, the fractures of Colles and of Pott, and other fractures near the wrist and ankle, are fully dealt with. The abduction treatment of fracture of the neck of the femur is well described. Needless to say, the necessity for *x*-ray pictures in the treatment of fractures and their medico-legal importance are insisted on, although there are not many radiograms in the book itself.

[1] *A Text-Book of Fractures and Dislocations.* By S. B. Kellogg Speed, M.D., F.A.C.S. Second edition, enlarged and thoroughly revised. London: H. Kimpton. 1928. (6 × 9½, pp. xiv + 952; 987 figures. 50s. net.)

DISEASES OF METABOLISM.

PROFESSOR FREIDRICH UMBER of Berlin is well known in Central Europe as an authority on nutritional and metabolic disorders. His new book on metabolic disorders[2] is a compact and readable synopsis, designed for practitioners, of his well-known larger work on disorders of nutrition and metabolism, of which the third edition, with lengthy post-war revision, appeared in 1925. It resembles in style and scope the Modern Medical Monographs of this country, but is not so well produced as these volumes. Good diagrams are lacking, and there is no readily available bibliography. The book opens with an account of the present state of our knowledge relating to nutrition and metabolism. Detailed reference is made to the large-scale experiments in nutrition made necessary in Central Europe by the war. The known vitamins, A to E, are fully described, with special reference to their action in states of undernutrition. There is a chapter devoted to obesity and its pathology, particular emphasis being laid on the part played by the endocrine system in the production of this disorder; the treatment is described in well-condensed tables. About half the book is devoted to diabetes mellitus. A very well-arranged and complete survey of the etiology, pathology, clinical aspects, and complications is given, and treatment is fully considered. There are further chapters on diabetes insipidus, gout, calculus formation, and metabolic anomalies. The book, which consists mainly of a collection of articles that appeared last year in the *Münchener medizinische Wochenschrift*, contains nothing hitherto inaccessible to English and American readers. But if only on account of the author's great reputation in Central Europe it should be read by those requiring a knowledge of Continental practice in diseases of metabolism.

NEPHRITIS.

ONE of the advantages of endowed lectures at the Royal Colleges is that they stimulate the publication of original work, clinical experience, and reviews of special subjects, and thus may pave the way for a more expanded treatment of the subject. Last year Dr. IZOD BENNETT, a former student of Bright's Hospital, as the Goulstonian lecturer at the Royal College of Physicians of London, took as his subject some problems of nephritis, and now he has in *Nephritis: Its Problems and Treatment*[3] republished these three lectures with but little change, and supplemented them by two fresh chapters on the classification of nephritis and on its treatment. The problem how to fit all the forms of renal disease with their transitions into a satisfactory table has attracted the keen minds of several generations. Dr. Izod Bennett, after criticizing Widal's classification, adopted by MacLean, of hydraemic and azotaemic nephritis as unsatisfactory in that some, and perhaps the majority, of the cases met with in practice fail to fall clearly into either group, brings forward a different classification which is in full accord with Aschoff's recent writings. It consists of three categories: the nephroses; the acute and chronic diffuse, and the focal and embolic forms of glomerulo-nephritis; and arteriolo-sclerosis, divided into the pre-nephritic stage of essential hypertension, the later stage of chronic interstitial nephritis, and the malignant renal sclerosis of Fahr. The chapter on treatment of different forms contains a number of useful tables on diet, and, like the rest of the book, is clearly written and stimulating.

In his compact book *On Nephritis*[4] Dr. CECIL ALPORT has succeeded in giving a clear summary of the present state of medical opinion on the different forms of kidney disease without entering into minute details which might confuse

[2] *Die Stoffwechselkrankheiten.* Von Professor Dr. Freidrich Umber. Zweite, neubearbeite Auflage. Klinische Lehrkurse der *Münchener medizinische Wochenschrift*, Band 4. München: J. F. Lehmann. 1929. (Med. 8vo, pp. 168. M.5.)

[3] *Nephritis: Its Problems and Treatment.* By T. Izod Bennett, M.D.Lond., F.R.C.P. Oxford Medical Publications. London: Milford, Oxford University Press. 1929. (Demy 8vo, pp. viii + 94; 3 figures. 6s. net.)

[4] *On Nephritis (for the Student and the Practitioner).* By A. Cecil Alport, M.D., M.R.C.P. With an introduction by Professor Frederick Langmead, M.D., F.R.C.P. London: W. Heinemann (Medical Books) Ltd. 1929. (Cr. 8vo, pp. xvi + 175; 2 plates, 4 figures, 3 charts. 7s. 6d. net.)

the student and busy practitioner. Dutifully dedicated to "Ricardus Bright, the Father of the Medical Unit System," of whom two portraits are included, the volume begins with a brief historical outline of the subject. Here the probable neglect of the etiological importance of the toxic factor in chronic parenchymatous nephritis is mentioned and illustrated. The author recognizes that his classification of diseases of the kidney into four groups—inflammatory or parenchymatous, vascular, a special group for Rose Bradford's kidneys, and the nephroses—is not absolutely watertight, for the last two cannot be detached from the later stages of the first group, and the senile kidney, though included under the vascular category, is not so much a disease as a part of old age. The several forms of nephritis are then described, and special chapters are devoted to the eye changes in nephritis, to uraemia, and to the urinary and functional tests. An appendix contains "A pharmacopoeia of drugs for use in renal disease (for students)"; this tactful parenthesis may, however, be neglected by the practitioner, who, as elsewhere in this readable handbook, will find much to satisfy his thirst for information and guidance.

SPEECH DISORDERS.

THERE are two comparatively recent works published in the United States that are of value in the consideration of disorders of speech, one by Dr. J. S. GREENE on *The Cause and Cure of Speech Disorders*,[5] and the other by Dr. J. M. FLETCHER on *The Problem of Stuttering*.[6]

Dr. Greene's book is a systematic study, and aims at being a textbook. He differentiates between the person who stutters or hesitates in his speech, the stammerer who is unable to utter certain sounds, and the person whose voice is abnormal. In his view the plight of the stutterer has not been bettered in recent years owing to the continued search for a physical cause of the condition. It is not realized that what he needs primarily is a mental reconstruction besides correction of his objective faulty speech habit and mannerisms. Dr. Greene maintains that there is nothing physically wrong with the sufferer, that he can use his speech organs as well as anyone else, and that time and energy are wasted in physical exercises. Each case demands special treatment, since stuttering is only a symptom displayed by an individual with a nervous constitution. To effect a cure a composite therapy—medical, psychological, re-educational, and social—is necessary. This scheme, it is claimed, has been a great success in the National Hospital for Speech Disorders in New York (the first hospital of the sort), of which Dr. Greene is the director. Stammering, he maintains, is a defect in enunciation which is not dependent upon the emotional speech life of the individual, but upon the mechanical speech life. His treatment, which is set out in full, differs according to the type of defect, and it is claimed that it is most successful.

Dr. Fletcher is a psychologist and approaches the problem from that standpoint and not that of a medical practitioner. He has some scathing criticisms to make of Dr. Greene's methods and of his book; indeed, he charges him with being ignorant of the history of the subject that he is treating! Dr. Fletcher certainly knows his history, and his book is worth reading if only for its summary of what has been done in the past. The number of cures is amazing, from mental to surgical, including a number of operations upon the tongue and throat. There is an excellent review of the most recent work in psycho-analysis. The followers of Freud do not appear to have succeeded. In eleven years Brill handled 600 cases, and attempted psycho-analysis in sixty-nine; five were cured, but one of these relapsed. Reed says that the stutterer will eventually be found to contradict almost every theory that may be set forth regarding the nature of his trouble. He could trace no definite traumatic experiences, no inhibitions against obscene words, and no connexion with sex-experience, such as earlier investigators had found. Dr. Fletcher gives a very lucid exposition of his own views. He considers that in these cases we are not concerned with the abstracted processes of articulation with which the speech specialist deals, but speech as a complex mental reaction to a concrete social situation; it is always *ad hoc*. "The situation is a function of vocal communication." This explains the failure of many forms of environmental training. Children in some schools are brought into apparent speech control, but they fail hopelessly so soon as they are outside, for the situation has changed. He maintains that the chief problem in the stutterer's self mastery is that of discovering and of fostering within himself certain mental and emotional states which are (*a*) known to affect his speech favourably, and (*b*) which he finds it possible to maintain under the stress of actual speaking conditions. This book by Dr. Fletcher is a clear and scientific study of a difficult problem.

[5] *The Cause and Cure of Speech Disorders.* By James Sonnett Greene, M.D., and Emilie J. Wells, B.A. New York: The Macmillan Company. (Demy 8vo, pp. x + 458; illustrated. 20s. net.)

[6] *The Problem of Stuttering.* By John Madison Fletcher, Ph.D. London and New York: Longmans, Green and Co., Ltd. (5¼ × 8, pp. xiv + 362; 5 illustrations. 10s. 6d. net.)

MELLOR'S CHEMISTRY.

THE eighth volume of Mellor's Chemistry[7] is devoted to nitrogen and phosphorus. Reviews of preceding volumes of this treatise have appeared from time to time in this *Journal*, and little need be added to the praise already accorded to the author's work. It is a classical production in the truest sense, for it is impossible to glance through its pages without gaining the impression that nothing has been overlooked in its preparation. The voluminous references to bibliography appended to each discussion can only be described as amazing. The statements contained in the text are assembled in a connected sequence that must have cost untold labour in arrangement, and, having regard to their multitude, one can only wonder how it was done. Not a word is wasted to make a sentence brief, nor spared to make a sense clear. But the supreme delight is the spirit of romance with which the whole work is clothed, beginning with the dedication which is inscribed: "To the privates in the great army of workers in chemistry. Their names have been forgotten. Their work remains"—and continuing throughout with every attention to the arresting details of history. Thus we may read here how in 1680 Robert Boyle deposited with the secretary of the Royal Society a sealed packet containing an account of his preparation of phosphorus which was published posthumously in 1693, and how Dulong, after his discovery of the dangerously explosive nitrogen chloride, continued his work on this compound after it had cost him the loss of three fingers and one eye. To this book belongs the place of honour in any chemical library.

The ninth volume is also now ready and deals with the group arsenic, antimony, bismuth, and the related rarer elements. In this group there are perhaps fewer matters of general or non-technical interest, and the volume is mainly occupied with the terms of pure chemistry, but there is much information of absorbing interest on arsenic in its relation to life and living creatures.

NOTES ON BOOKS.

THE publication of a sixth edition of *Diseases of Infants and Children*,[8] by Dr. H. D. CHAPIN and Dr. L. T. ROYSTER, within a few years of the fifth is a proof of the popularity of this work. Much revision and elaboration has been necessary to incorporate recent progress in paediatrics, and this has been accomplished without materially adding to the size of the book, although the method of putting a great deal of matter in small print is open to objections. This book is intended essentially for those who wish to have a somewhat complex subject presented in as brief a form as possible. The authors have succeeded in the main, although the result is by no means a small volume, while in places clarity has been sacrificed to brevity. It is to be regretted that no references to authors quoted are given anywhere in the book.

[7] *A Comprehensive Treatise on Inorganic and Theoretical Chemistry.* By J. W. Mellor, D.Sc., F.R.S. Vols. viii and ix. London: Longmans, Green and Co., Ltd. 1928. (Roy. 8vo, vol. i, pp. x + 1110; 156 figures; vol. ii, pp. xi + 967; illustrated, each volume 63s. net.)

[8] *Diseases of Infants and Children.* By Henry Dwight Chapin, M.D., and Lawrence Thomas Royster, M.D. Sixth, revised edition. London: Baillière, Tindall and Cox. 1928. (6 × 9¾, pp. xv + 675; 184 figures, 9 plates. 30s. net.)

Dr. F. ROQUES's work on epidemic encephalitis in pregnancy, labour, and the puerperium,[9] which represents an amplification of a review recently published in the *Journal of Obstetrics and Gynaecology of the British Empire*, is based on the study of 40 previously unpublished English cases under treatment at Sheffield, the National Hospital, Queen Square, and the Middlesex Hospital, and 171 cases, mostly of Continental origin, collected from the literature. The obstetrical aspect of acute epidemic encephalitis and Parkinsonism, which has hitherto received little attention from British writers, is fully discussed in all its bearings, including the condition of the child born to the infected mother. A full bibliography is appended, but there is no index. The work should find a wide circle of readers, appealing as it does alike to the obstetrician, the neurologist, the consulting physician, and the general practitioner.

We have received three instalments of a new German series entitled practical differential diagnosis for practitioners and students,[10] and edited by Professor GEORG HONIGMANN. They constitute parts 5 to 7 of the first volume, which is devoted to internal medicine. Diseases of the liver and bile ducts are dealt with by Professor GLÄSSNER, medical diseases of the locomotor system by Dr. ERNST FREUND and Dr. ALBERT SIMO, and infectious diseases by Dr. ALBERT HERZ. The information given is concise, clear, and practical, so that these three little works can be consulted with profit by those familiar with the German language.

In a little book entitled *Morpheus, or the Future of Sleep*,[11] Professor FRASER-HARRIS deals in a pleasant and informative way with the subject of sleep. He attributes sleep to four influences—chemical (fatigue products), the absence of sensations, the absence of emotion and ideas, and the diminution of the blood supply of the brain. He gives some hints as to the hygiene of sleep, and discusses dreams, attributing them chiefly to aberrant sensory impressions, and scarcely at all to unconscious influences, as some would do. Finally, he puts in a strong plea for the abolition of noise in the future regulation and planning of cities.

Who's Who in the Nursing World[12] for 1929—the second year of issue—gives information about the various administrative, examining, and training bodies and institutions, and other organizations concerned with the nursing profession, together with biographical notes of its leading members.

Sir RONALD ROSS's Nobel Prize Lecture, originally given in 1902, when the award was made to him, and published under the title *Researches in Malaria* two years later, has now been published in a French translation.[13]

We have now received the second part of the fourth edition of Professor HERBERT ASSMANN'S textbook of radiological diagnosis[14]; the first part was noticed in these columns on December 8th, 1928 (p. 1042). The second volume begins abruptly in the middle of the section relating to the stomach, and deals with the remainder of the abdominal organs, the nervous system, and the joints and muscles. Many of the numerous illustrations are good. The book may be recommended as a companion to the first volume, from which it is inseparable owing to the rather unfortunate division of the matter contained in the two parts.

Dr. JOHN D. GIMLETTE'S *Malay Poisons and Charm Cures*[15] has now been republished in a third edition, the text having been revised, with numerous additions. This work has been found of considerable practical value to those engaged in medico-legal work in the Far East since it was first published in 1915. It is also of interest to those who make a study of folklore and oriental beliefs and customs. A review of the second edition appeared in our issue of February 10th, 1923.

In *An Investigation of the Milk Yield of Dairy Cows*[16] Mr. J. F. TOCHER, D.Sc., of the University of Aberdeen, gives a statistical analysis of the data of the Scottish Milk Records Association for a number of years. This monograph, reprinted from *Biometrika*, is not only of considerable interest to statisticians, but should prove of practical value to those concerned with milk production.

[9] *Epidemic Encephalitis in Association with Pregnancy, Labour, and the Puerperium.* By F. Roques, M.D., M.Chir.Cantab., F.R.C.S.Eng. Manchester: Sherratt and Hughes. 1928. (Roy. 8vo, pp. vii + 143. 15s. net.)

[10] *Praktische Differentialdiagnostik fur Ärzte und Studierende.* Herausgegeben von Professor Dr. Georg Honigmann. Band I: Innere Medizin, Teil 5: Erkrankungen der Leber und Galle. Von Dr. Karl Glässner; Teil 6: Innere Krankheiten des Bewegungsapparates. Von Dr. Ernst Freund und Dr. Albert Simo; Teil 7: Infektionskrankheiten. Von Dr. Albert Herz. Dresden und Leipzig: T. Steinkopff. 1929. (Med. 8vo, Teil 5, pp. 327-392, M.4.50; Teil 6, pp. 393-448, 14 figures, M.4.50; Teil 7, pp. 449-552, M.6.)

[11] *Morpheus, or the Future of Sleep.* By Professor D. F. Fraser-Harris, M.D., D.Sc., F.R.S.E. To-day and To-morrow Series. London: Kegan Paul, Trench, Trubner and Co., Ltd.; New York: E. P. Dutton. 1928. (Fcap. 8vo, pp. 94. 2s. 6d.)

[12] *Who's Who in the Nursing World.* Compiled and edited by H. E. Smithers. Second year. London: Professional Publications, Ltd. 1929. (Fcap. 8vo, pp. xv + 331; illustrated. 5s. net.)

[13] *Une Grande Page de l'Histoire de la Médecine: La Découverte de la Transmission du Paludisme par les Moustiques.* Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S., etc. Préface et Traduction de l'anglais par le Dr. Charles Broquet. Paris: N. Maloine. 1929. (5¾ × 7¾, pp. 174; 7 figures, 9 plates.)

[14] *Die Klinische Röntgendiagnostik der Inneren Erkrankungen.* Von Dr. Herbert Assmann. Vierte umgearbeitete und verstärkte Auflage. II Hälfte. Leipzig: F. C. W. Vogel. 1929. (7¼ × 10½, pp. 513-1071; 568 figures, 5 plates. M.35.)

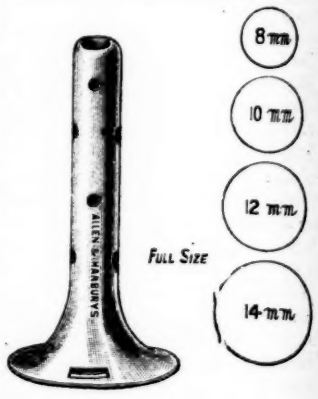
[15] *Malay Poisons and Charm Cures.* By John D. Gimlette, M.R.C.S., L.R.C.P. Third edition. London: J. and A. Churchill. 1929. (Demy 8vo, pp. xiv + 301; illustrated. 10s. 6d.)

[16] *An Investigation of the Milk Yield of Dairy Cows.* By J. F. Tocher, D.Sc., F.I.C. From *Biometrika*, vol. xxb, Part 2, September, 1928. London: Biometric Laboratory, University College. 1928. (Imp. 8vo, pp. 105-244; illustrated.)

PREPARATIONS AND APPLIANCES.

DYSMENORRHOEA TUBES OR UTERINE STEMS.

MR. W. MCKIM H. MCCULLAGH (London, W.1) writes: Dilatation of the cervix for dysmenorrhoea gives freedom from pain of the spasmodic type for only twelve to fourteen months, as a rule. Stems have been used to ensure prolonged dilatation at the time of operation, and are inserted for four to five days. Their employment lengthens the time of freedom from recurrence of the pain.



Since those in use are usually of solid glass, and so prevent drainage of the uterine cavity, and also because their measurements are not graduated to suit different sizes of uteri, it was thought that the nest of stems pictured in the diagram would be an improvement. They are silver electro-plated on brass, and of four sizes, 8, 10, 12, and 14 mm., corresponding to the dimensions of Hegar's dilators. They are hollow, and rounded at the upper end; the wall of the tube is perforated with small holes. The base has two apertures for the insertion of a withdrawal tape. They are long enough to occupy the uterine cavity, and so straighten an acute anteflexion of the corpus uteri.

The cervix and body of the uterus are dilated to the extent desired, and a stem of the size smaller is inserted after steadying and exposing the cervical canal by vulsellae on the anterior and posterior lips.

A nest of four of these is made and supplied by Allen and Hanburys Ltd., Wigmore Street, W.1.

QUINOXYL.

Quinoxyl, a preparation recently put on the market by Messrs. Burroughs Wellcome and Co., is a mixture of 80 per cent. iodohydroxyquinoline sulphonic acid ($C_9H_6O_4NIS$) with 20 per cent. sodium bicarbonate. Oxyiodoquinoline sulphonic acid was introduced many years ago as a wound disinfectant under the name "loretin"; moreover, the drug yatren, which has been extensively advertised as a wound disinfectant and also as a gut disinfectant, contains, according to Anselmino, 8-oxy-7-iodoquinoline sulphonic acid mixed with 20 per cent. sodium bicarbonate.

In 1921 oxyiodoquinoline sulphonic acid was recommended as a treatment for amoebic dysentery, and it has been found very satisfactory for this purpose. The dose by mouth is 0.25 to 1 gram. It can also be used as an enema, 5 grams in 200 c.cm. water. The toxic effect of the drug is said to be negligible.

SPRAY FOR LARYNGEAL TUBERCULOSIS.

Dr. PERCY MOXEY (Southampton) writes: Those of us who are engaged in dealing with cases of pulmonary tuberculosis have often noticed how very rapidly the cases go downhill once the larynx becomes involved, and how very little can be done to arrest this very troublesome and distressing complaint. From time to time I have tried numerous remedies, chiefly in the form of sprays and inhalations, and have never found anything of real value until recently I tried the effect of a spray of a 2 per cent. solution of collosol mercurochrome (Crookes). This spray is used two or three times a day, with the patient inhaling during the process of spraying, and so far, during the time that I have used it, some three months, every case has benefited—pain has been alleviated, the voice has improved, and there has been a marked improvement in the general condition. Most of my cases have been treated under sanatorium conditions, but, even so, the results from the use of this preparation have been much better than those obtained by any of the other methods I have tried.

British Medical Journal.

SATURDAY, MARCH 23RD, 1929.

THE ULTRA-MICROSCOPIC VIRUSES.

ALTHOUGH the meeting held recently at the Royal Society to consider the ultra-microscopic viruses[1] achieved little in the way of a discussion, it has at least served a useful purpose. It has provided an excellent summary of the present position of our knowledge of these agents of disease which will be appreciated by those of us who are not familiar with the recent developments in this subject, and, what is equally important, it brought together plant and animal pathologists, who were thus given an opportunity—unfortunately a rare event—of exchanging ideas and seeing how this problem is being tackled in a field of work other than their own particular one.

The problem of the nature of these ultra-microscopic viruses is most perplexing, and extremely difficult of solution. It cannot be dismissed as a question of mere academic importance, an attitude that the pragmatist adopts too readily towards much research, for since the work of Beijerinck on the filterability of the agent of mosaic disease in plants, and of Loeffler and Frosch (1898) on the virus of foot-and-mouth disease, the list of diseases, both of plants and animals, which are due to agents of this class has reached such proportions as to make it imperative to understand the nature of these agents and so be in a position to deal with their ravages in a scientific and more successful manner. In man such diseases as small-pox, chicken-pox, zoster, measles, mumps, yellow fever, dengue, and possibly influenza, epidemic encephalitis, and the common cold, are believed to be due to these so-called ultra-microscopic or filterable viruses; in animals we have foot-and-mouth disease, distemper, rabies, fowl plague, swine plague, and rinderpest—an incomplete but formidable list.

What is the probable nature of these viruses? Broadly speaking, there are two hypotheses current. The one would have us look upon them as something unorganized, enzyme-like in nature, possibly the result of some deranged function of tissue cells, which, once having been generated, would be capable of again setting in train those changes which in the first instance produced them. In other words, they are the products of damaged cells, and though capable of engendering disease are more truly the result of it. The other hypothesis envisages these disease agents as living things and quite possibly bacterial in nature. The former view has been ably championed by Boycott, and its supporters have advanced experimental evidence which purports to show that a virus disease can be produced in a healthy animal or plant by the inoculation of virus-free material. Experiments of this kind discount the possibility that stock which appear perfectly healthy can be virus carriers. That such a possibility does nevertheless exist is now beyond doubt, and the evidence which Dr. Salaman placed before the meeting recently is convincing testimony on this point. He described experiments showing how practically every plant of a certain variety of potato, though apparently healthy, carried the virus of a disease which could be brought to light by grafting on to potato plants of a susceptible variety. There is, however, nothing revolutionary in the idea that apparently healthy stock should be virus carriers. It occurs in the case of bacteria, and the work of Webster in America on the carriage of *B. lepisepticum* (the cause of snuffles) in laboratory stocks of rabbits, and the investigations of Lauda showing that certain stocks of rats are carriers of a bacterium (one of the *Bartonellae*), are excellent examples of this. The latter is of particular interest. This organism can produce an anaemia which is frequently fatal, but the rats never sicken spontaneously; only when the spleen is removed and the balance between host and parasite is upset does this bacterium gain the upper hand and produce disease. Were it not for the fact that this organism can be demonstrated by bacteriological methods this condition might have been cited as an example of the spontaneous production of a virus.

The second hypothesis—namely, that filterable viruses are organized living things—was subscribed to by the majority of the speakers at the Royal Society symposium. Undoubtedly it is difficult to draw a clear line of demarcation between the living and the non-living. There is no single criterion of life, but several features taken together—such as capability of multiplication, adaptability to changes in environment, and the power of assimilation from the surrounding medium without loss of identity—are characteristic of living things. There is much evidence that filterable viruses fulfil these criteria just as much as bacteria do. These viruses, as Sir Charles Martin pointed out, differ only from bacteria in their smaller size and the difficulty of growing them in a lifeless medium. But even these are not features which clearly differentiate. There are visible pathogenic bacteria, such as the leprosy bacillus, which have so far resisted all attempts to cultivate them. Some cultivable and visible bacteria, such as those isolated by Olitsky and Gates from the nasopharynx of man, are filterable, and there is evidence that some of the so-called ultra-microscopic viruses are probably within the limits of microscopic vision. Paschen of Hamburg and Gordon in this country claim to have demonstrated the virus of vaccinia in stained preparations, and Professor Ledingham, from his own observations, said that he saw no difficulty in accepting these bodies as the virus.

While paying testimony to the valuable work which had been achieved by Mr. Barnard in ultra-microscopy, Professor Ledingham expressed the view that there was still much that could be done in the study of the morphology of these viruses by ordinary microscopical methods. Dr. C. H. Andrewes claimed that a distinguishing feature between filterable viruses and bacteria was the type of immunity which they evoked. He stated that infection with a virus gave rise to a lasting (frequently lifelong) immunity, and suggested that this was due to the persistence of the virus in the infected animal after recovery. But there are bacterial diseases, such as syphilis, in which the immunity is determined by the persistence of the infective agent in the body, and as far as the duration of immunity is concerned examples can be cited of virus diseases, such as foot-and-mouth disease, in which the immunity produced is of comparatively short duration, and herpes in man, where practically no immunity at all results from an attack. Further, the immunity which a virus confers varies much with the animal species infected. It is true that Dr. Andrewes cited experiments which suggested that antiviral serums behaved in a different way from antibacterial serums; but the antigen-antibody reactions studied in the past have been characterized by a fundamental similarity,

[1] The first part of the discussion was reported in the *British Medical Journal* of March 9th (p. 447), and a report of the second part is published this week at page 550.

whether the antigen was a simple protein or a living organism. Since filterable viruses are antigenic, and therefore protein, there seems no good reason for supposing that their behaviour will differ materially from that of other antigens and antibodies.

SILICOSIS AND THE WORKMEN'S COMPENSATION ACT.

PROGRESS is being made in bringing under the Workmen's Compensation Act the disabling condition of silicosis, or silicosis accompanied by tuberculosis. Serious practical difficulties led the Committee on Compensation for Industrial Diseases (which reported in 1907) to recommend, as the then more prudent course, that the question of scheduling the disease should be kept in abeyance for the time being. In 1917 pressure was again brought to bear on the Home Office to deal with the subject, owing to the successful measures adopted in the gold-mining industry of South Africa, under successive Miners' Phthisis Acts. These measures have greatly reduced illness by watering, etc., to minimize the dust, and by periodic medical examination to eliminate men found to be suffering from the disease, while awarding them generous compensation. As a result a method was devised for dealing with the difficulties of the situation in this country by "schemes," each applicable to a particular industry or group of industries.

At present three schemes are in operation—the Refractories Industries Scheme, the Metal Grinding Scheme, the Various Industries Scheme—while a fourth has recently been issued in draft for the sandstone industry. Perusal of the four schemes brings out what appears to be a strange inconsistency: those for the Refractories and Sandstone Industries embrace compensation for partial incapacity as well as for death and total incapacity, while the other two are restricted to death and total disability. The reason, of course, is mainly the burden placed on an industry by the payment of claims continued over a period of years in cases of partial disability, involving a levy perhaps of 5 or 6 per cent. on the wages bill from the employers in the particular industry. But, further, in these schemes a profound difference is to be observed in the way in which compensation is obtainable by the workman. Thus, in the two schemes with compensation for partial incapacity this is obtainable only through certification by a medical board, while in the other two compensation is obtainable through certification by the factory surgeon, with the usual right of appeal, either by the employer or workman, to a medical referee. Now the unsuitability of the certifying factory surgeon for diagnosing cases that involve claims for silicosis is self-evident. It is not that he would not be right in most cases, but that he would never be sure that he was, since he has to make his diagnosis at a single interview (at a fee of 5s.) without the aid of an *x*-ray photograph. The Various Industries Scheme, which has just come into force, adopts the discredited rule of restricting compensation to death and total incapacity, whereas the draft Sandstone Industries Scheme, of a later date, handsomely expresses readiness to recognize partial incapacity as rightly entitling to compensation. To be fair one ought to say that the Home Secretary is evidently aware of the Gilbertian quandary, and the appointment of the Silicosis (Medical Arrangements) Committee is a gallant effort at extrication.

Yet another scheme is in preparation—that for the Pottery Industry. The preliminary survey[1] by Drs. C. L. Sutherland and S. Bryson—members of the medical board appointed under the Refractories Industries Scheme—brought out the fact that of 72 elderly men exposed to unmixed flint dust 47 were found with fibrosis, and of 49 of those examined radiologically 23 showed silicosis. We have before us a similar survey by the same highly qualified medical men[2] (working under the supervision of Dr. E. L. Middleton, H.M. Medical Inspector of Factories) of their clinical examinations of 461 men (of whom 281 were radiologically examined) working on sandstones. In this inquiry the examinations were confined to men employed at the time, no cases of persons already disabled being included, but relatively higher proportions were included of those who had worked for longer periods. The disturbing fact emerges that among masons, quarrymen, and wallstone dressers, about 50 per cent. showed positive evidence of silicosis radiologically. The critical period appears to be between twenty and thirty years of employment. A concluding statement in the latest report by Drs. Sutherland and Bryson is important as pointing to real prevention of the trouble by bringing an influence to bear external to the workman—that is, one over which he can exercise no control—namely, a very effective "device for the application of localized exhaust draught for removal of dust produced by pneumatic surfacing tools." This obviously means that a method has been discovered for utilizing for this purpose the compressed air after it has done its boring work.

Public announcement has been made within the last few days of an international conference of experts on silicosis to be held at Johannesburg in August next year, the Transvaal Chamber of Mines contributing £2,000 towards the expenses and the International Labour Office being asked to vote another £1,000. This is all to the good, and should at least (1) throw light on the detailed administration necessary to work out effectively the schemes we have referred to, and (2) induce Continental countries to deal with this problem, the importance of which they have not apparently hitherto realized. As we go to press we see that a Silicosis Committee has just published a detailed account of the occurrence of this disease in New York City,[3] which we hope to discuss in a future issue.

ACTINOTHERAPY.

WE have on various occasions felt obliged to introduce a note of discord into the harmony that has prevailed between the general public, certain over-zealous practitioners, and the manufacturers of arc lamps, on the subject of the therapeutic value of ultra-violet radiation. In this imperfect world no remedy is perfect, and not even the best advertising can make it so. We have endeavoured to indicate some of the limitations of a treatment which many have regarded as a panacea, and to point to dangers that might follow its improper application, without, however, minimizing the real benefits obtainable in suitable cases from its use by adequately trained persons. In this matter we were under the impression that we reflected the views shared by cautious experienced clinicians and workers engaged in academic research. We may recall that on October 13th, 1928 (p. 651), when commenting on papers in the same issue by Professor W. E. Dixon and Dr. C. B. Heald, read at the Annual Meeting of the British Medical

[1] Report on the Incidence of Silicosis in the Pottery Industry. London: H.M. Stationery Office. 1925. 1s. 6d. net.
[2] Report on the Incidence of Silicosis among Sandstone Workers. London: H.M. Stationery Office. 1929. 1s. 6d. net.
[3] Silicosis among Rock Drillers, Blasters, and Excavators in New York City, *Journal of Industrial Hygiene*, February, 1929.

Association at Cardiff, we held that "although actinotherapy cannot fulfil all the claims made for it by some of its more sanguine exponents, there exists a definite set of conditions in which its employment is indicated; and though in skilled hands it may provide a treatment of the first importance, improperly used it may do the gravest mischief. . . . Actinotherapy, properly applied, is an important agent in the amelioration of rickets and surgical tuberculosis—often, indeed, in these conditions producing complete cure; and certain neurological conditions, anaemias, and skin diseases, though not cured, are usually benefited by this treatment." We emphasized, on the other hand, that "to patients suffering from pulmonary tuberculosis, arterio-sclerosis, chronic nephritis, quiescent appendicitis, and various forms of neurosis, the application of ultra-violet radiation may do definite and irretrievable harm." On December 22nd, 1928 (p. 1150), we returned to the subject in an annotation dealing with a dangerous propaganda conducted in certain quarters in favour of self-administration of ultra-violet radiation by lay persons. It will be observed that we were content merely to sound a note of warning. The Medical Research Council has now gone much further, and the current belief is that it is bent on putting out the lights with a douche of cold water. In its report for the year 1927-28, to which detailed reference is made elsewhere (p. 566), the Council states that "the use of artificial light to supply only what the right food can give is merely wasteful"; that in the treatment of children "no objective evidence is provided that results have been achieved that could not have been far more cheaply gained by proper food"; that the increased bactericidal power of the blood, shown in the laboratory to be produced by this treatment, "has not yet been correlated with any permanent effects of value in the body"; that the "same effects for good or evil follow inflammation of the skin blood vessels inflicted by heat, or by other irritants than light"; and that "there is no present reason to know that artificial light can do more in this way than a mustard plaster." These conclusions are apparently based, in part at least, upon two investigations—one already published, conducted in 1925 by Dr. Helen Mackay under the auspices of the British Medical Association, on the effects of ultra-violet light given by the mercury vapour lamp upon the health of infants from the East End of London (all subnormal in physique), and the other, now in the press, carried out by Dr. Dora Colebrook, with the approval of the Board of Education, on the effects of light upon children at school. The value of such controlled investigations cannot be overestimated; but when, as in this case, they point to conclusions at variance with those of a large body of experienced clinicians and laboratory workers, caution suggests that final judgement should be suspended until a great deal more work has been done and the seeming contradictions in the results have been resolved. The antidote to over-credulousness is not complete incredulity, but a balanced opinion based on full consideration of all the available facts. We are therefore in cordial agreement with the Medical Research Council when, at the end of this section of its report, it urges the need for "properly controlled trials" at hospitals and clinics employing artificial light.

MUSSELS AND MUSSEL-BORNE DISEASE.

IT is a far cry from gaol fever to an oyster-borne or mussel-borne disease, though it is not so very long since the conditions were first actually distinguished. To-day typhoid and typhus are known to be separate clinical entities, yet we can understand how the confusion that once existed between them arose and persisted. Suppose, however, that during the time the conditions remained undifferentiated both a louse-borne and a mollusc-borne origin had been established in respect of the same symptom group, would this etiological differentiation have raised the question of the identity of the clinical complex? The existence of an apparently twofold etiology would certainly have stimulated inquiry, and no doubt a distinction would have emerged in terms of the measures necessary for the control of each of the causative factors. But, however unrelated they may appear, the work of the clinician and the etiologist go hand in hand, and the Ministry of Agriculture and Fisheries was wise to entrust an inquiry into the sources and methods of prevention of mussel pollution to a medical man who may bring to his investigation the informed vision essential to its successful outcome. The report on mussel purification[1] prepared by Dr. R. W. Dodgson is devoted to a detailed account of the part played by the mussel in the dissemination of typhoid fever, and to a discussion of the theoretical conditions and the practical measures involved in the control of this vehicle of infection. In a prefatory statement Dr. E. S. Russell, Director of Fisheries, writes: "It may seem strange that in a fisheries report so much attention is directed to questions of public health. But it is clear that in the long run the interests of the fishermen and of the public are identical. It is not to the advantage of the fishermen to put on the market a food which is or may be a potential danger to the public health, and it is the duty of the Fisheries Department to co-operate with the health authorities in stopping this gap in the nation's defences against infectious disease." This is excellent doctrine. In Dr. Dodgson's report the medical officer of health, and the estuarial and coastal health authorities desiring a concise account of mussel diseases and of the methods adapted to their prevention, will find the material they require. Mussel poisoning includes at least three distinct pathological conditions or types of conditions. The first is "musseling," a toxic idiopathy of which the chief characteristic is an erythematous rash produced in certain susceptible persons in response to the ingestion of mussel protein. The second is a paralytic condition, always grave and at times fatal. This type of poisoning is wholly distinct from "musseling," and has nothing in common with it either in respect of its etiology or of its characteristic symptoms. The cause, indeed, is unknown, but all the cases on record have followed the ingestion of mussels from foul or stagnant waters. The condition is extremely rare, only about ten cases being on record, and probably it could be eliminated altogether if elementary precautions were exercised and only purified mussels eaten. The third variety is a condition of bacterial food poisoning. If purified mussels only were eaten the risk of food poisoning would probably be no greater than that which might follow the consumption of other foods. But the chief problem is undoubtedly in relation to the mussel as an agent in the dissemination of typhoid fever, and Dr. Dodgson's investigations would appear to have rendered possible a method of mussel cultivation by which this particular danger has been successfully eliminated. Potentially, mussels are more dangerous than oysters, not only because their habitat is nearer to sources of pollution, but because they are more liable to be polluted than oysters living under exactly the same conditions. The technique of mussel cleansing does not appear to be formidable, and it is given in detail in the report: in essence it consists of hosing and bedding in sterile baths, by which the mussel is afforded the opportunity of self-cleansing under conditions in which reinfection from its own integuments and accreta is rendered impossible. In order fully to safeguard the public the process should be applied universally, all mussels, whether cultivated at home or imported, being regarded as contaminated. There can be no doubt that these measures,

[1] *Report on Mussel Purification.* By R. W. Dodgson, M.D., M.R.C.P.Lond., M.R.C.S.Eng. Ministry of Agriculture and Fisheries: Fishery Investigations, Series II. Vol. X, No. 1, 1928. London: H.M. Stationery Office. 1928. (Imp. 8vo, pp. xvi + 497; 15 plates, 9 figures, 3 maps. £1 1s. net.)

though they may appear to be unduly rigorous, are economically sound: outbreaks of typhoid fever cost far more than the measures which might have prevented them.

ACCIDENTAL HAEMORRHAGE AND PLACENTAL INFARCTION.

THE etiology of accidental haemorrhage has for some years attracted investigators, who have been primarily concerned with the problem whether toxaemia of pregnancy should be looked upon as the cause of accidental haemorrhage or as its sequel. In 1926 F. J. Browne communicated the results of his experimental studies to a meeting of the Edinburgh Obstetrical Society, and this admittedly preliminary statement was published that year in the *British Medical Journal* (April 17th, p. 683). Professor Browne has continued this line of research, and some further experimental observations have now been published by him in association with Dr. Gladys H. Dodds, in the *Journal of Obstetrics and Gynaecology of the British Empire* (vol. 35, No. 4). It may be recalled that the investigation began in 1923 with the discovery that injecting a rabbit on the twentieth day of pregnancy with *B. pyocyaneus* gave rise to revealed and concealed haemorrhage four hours later, while the kidneys showed the presence of acute nephritis. Repeated attempts during the next two years to reproduce such experimental bleeding failed. Evidence from hospital and private patients began to accumulate, and supported the view that chronic nephritis existing before pregnancy predisposed to haemorrhage. In the present investigation, which was undertaken to clear up certain doubtful points, and especially to ascertain the important factors in the production of haemorrhage, a new series of 35 rabbits was injected with sodium oxalate in order to produce chronic nephritis; the rabbits were then mated. At the twentieth day of pregnancy (corresponding to the sixth month in the human subject) acute exacerbation of the nephritis was caused by a fresh injection of sodium oxalate, after which an emulsion of *B. pyocyaneus* was injected intravenously; accidental haemorrhage ensued in every case. The sodium oxalate was excluded as the cause of the haemorrhage by injecting uranium nitrate first and the bacillary emulsion subsequently. It was then found that in the presence of chronic nephritis haemorrhage could be readily induced by the injection of *B. pyocyaneus* alone, without it being necessary to inject uranium on the twentieth day, and that in animals suffering from chronic nephritis the production of the acute form by the injection of uranium was sufficient to cause haemorrhage without any subsequent injection of the bacillus. In the absence of chronic nephritis the injection of *B. pyocyaneus* did not usually set up ante-partum haemorrhage, even though the organisms caused acute nephritis, and no external bleeding occurred in any one of ten experiments designed to test this point. Further, the injection of uranium nitrate to cause an acute nephritis was not usually sufficient to induce ante-partum haemorrhage in the absence of chronic nephritis. Though in such chronic nephritic animals albumin may be absent between pregnancies and during the early part of pregnancy, it appears in the urine in the latter half of the pregnancy and before the onset of spontaneous haemorrhage. This is obviously of importance when considering the recurring toxaemia of pregnancy. The authors claim, therefore, that their results indicate that ante-partum haemorrhage is not due to organisms. It seems to be caused either by failure of the kidney to excrete poisons which eventually lead to the haemorrhage when they have accumulated in the circulation in sufficient concentration, or by chronic nephritis interfering with a normal metabolic function of the kidney. The outstanding conclusion of these careful and exhaustive experimental studies is that chronic nephritis is the one important predisposing cause of accidental haemorrhage. The authors discuss at length the pathology of placental infarction and its relation to external and concealed haemorrhage, chronic nephritis being the essential factor in both. They trace also a fundamental similarity between the haemorrhage and infarction found in cases of chronic nephritis and causing early abortion, and the concealed or revealed haemorrhage and infarction occurring in the last three months of pregnancy, and usually styled accidental haemorrhage.

THE EDUCATION OF THE CRIPPLED CHILD.

THE treatment and education of the cripple with the object of making him a self-reliant member of society is now so much a matter of course that it came almost as a surprise to hear, from the historical survey of crippledom given by Sir Henry Gauvain to the Medical Officers of Schools Association on March 15th, how recent is this outlook upon the physically defective. Throughout the centuries the cripple has been the object of pity, though often, among the coarser-minded, of derision, and even Charles Dickens, in his sympathetic delineations, could only suggest a cheery philosophy in acceptance of a hard lot. Dickens's *Christmas Carol*, however, had an outcome which its author could not have foreseen, for it inspired Sir William Treloar in his work for cripples, and ultimately led him to make the Alton experiment. One great pioneer step was the foundation, thirty years ago, of the Mary Ward (Mrs. Humphry Ward) School, now in Tavistock Place, better known as the Passmore Edwards Settlement, for children whose physical defects made it impossible for them to go to an ordinary school. This is the school, adjacent to the home of the British Medical Association, which was unexpectedly visited by Their Majesties when opening the Association headquarters in 1925. It was the first school for invalid and defective children to be supported out of the public rates. The first residential cripples' school to receive official recognition was one animated by the same spirit, and in which the medical profession has always taken a deep interest—the Heritage Craft School, at Chailey in Sussex, founded and conducted by Mrs. Kimmins. The establishment of Lord Mayor Treloar's Cripples' Home at Alton was an outstanding result of this new development of the social conscience. Among other aspects of the same movement enumerated by Sir Henry Gauvain was the establishment of open-air schools, the first of which came into existence at Plumstead in 1907. The efforts made to restore crippled soldiers during and after the war also directed attention to crippledom in the civil population, and to the fact that much of it was unnecessary and avoidable; it began to be realized that treatment combined with education was not only an act of pity to unfortunate individuals, but a remunerative proposition for the State. Various investigations were made into the causes of crippling, which are chiefly tuberculosis, infantile and other forms of paralysis, congenital defects, rickets, and accidents. Rheumatism, said Sir Henry Gauvain, crippling enough in later life, rarely produced joint disease and crippling among children. The education of the cripple, suited to his limitations, and directed (especially later on) to a craft at which he might earn his livelihood, had had a distinct therapeutic value. It had brought to the cripple as many of the amenities and advantages of school life as possible. It had stimulated him to catch up with the normal. It had kept him busy, interested, and happy, and helped to remove his sense of inferiority, though there were still some forty hospitals in this country receiving cripples at which educational facilities were not provided. After a tribute to voluntary work, in which all social advance had originated, no step being taken by officialism until it had been tested by voluntary experiment, Sir Henry Gauvain recounted some interesting and highly encouraging cases which had come within his experience at Alton.

DEATH CERTIFICATION AND PREMATURE BURIAL.

THE Births and Deaths Registration Act, 1926, came into force on July 1st, 1927. It will be remembered that it dealt with the registration of stillbirths, and prescribed a new procedure with regard to the certification of deaths and the disposal of bodies. This new procedure has, we believe, operated quite successfully during the past year and a half, the only actual hitch in its smooth working having been overcome by a semi-official recognition by the Registrar-General that a medical practitioner must in certain circumstances be allowed to send the death certificate to the local registrar by the agency of the person liable to act as informant of the death for registration purposes, a course which might be held to be strictly illegal. There is still a serious gap in the law relating to the preservation of infant life left by the definition of stillbirth embodied in the Act, and an attempt to bridge this gap is being made in the Preservation of Infant Life Bill now before Parliament. As regards death certification and the disposal of bodies, however, most reasonable people are satisfied that the Act does, in fact, effect such reforms as were necessary to prevent premature interment or the detection of crime. Nevertheless there still remains a body of apprehensive and dissatisfied persons clamouring for further enactments. It is not unnatural that Sir George Greenwood should be their spokesman in a publication issued by the Oxford University Press on behalf of the Society for the Prevention of Premature Burial, and entitled *The Law of Death Certification*.[1] It consists very largely of a statement of the provisions of the Act of 1926, with comments thereon. The mistake is made of regarding this Act as a Government measure, whereas it was in fact introduced and piloted through Parliament by private members, and therefore could not contain any clause imposing a charge on public funds. There is a great deal of quite unnecessary repetition and reiteration throughout the volume, and a large amount of sarcastic abuse of everyone who does not agree with the writer. Considerable space is also occupied by quotations, mostly some years old, of remarks made from time to time by certain coroners whose taste for notoriety is itself notorious. The main grievances proclaimed appear to be two—one major and one minor. The minor grievance is that, though the prescribed form of the medical certificate of the cause of death may now be signed only by a registered medical practitioner "in medical attendance during the deceased's last illness," there is no definition of what constitutes such medical attendance. It has been suggested that this should mean "personal attendance by the person certifying upon at least two occasions, one of which should be within eight days of death," but Sir George Greenwood wants something more stringent even than this. Actual experience of ordinary medical practice makes it evident that any such definition would be likely to be both inconvenient and futile. The major grievance is that the law still leaves open the possibility of premature burial, inasmuch as it does not require the body to be viewed after death in every case by the practitioner certifying or some other registered medical practitioner. There are, of course, arguments in favour of such a requirement, and there would be no serious medical opposition to it under proper conditions; but its enactment would entail considerable expense either to the State or to the individual, would necessitate the making of special arrangements for the cases in which considerable distances have to be travelled or for action in time of widespread epidemics, and would probably be resented by the public in a great many cases. The opponents of this requirement hold that these considerations far outweigh any advantages that it would have over the precautions imposed by the recent Act. On the other hand, Sir George Greenwood and his fellow reformers cry: "Good God! if there is a chance of one man or woman in a thousand, in two thousand, in twenty thousand, in a million—if there is any possible chance at all—the risk is so unspeakably horrible that such chance ought to be eliminated absolutely and for ever." The "chance" is that of premature burial; and it will be noted that, however small this may be, absolute elimination is demanded. But these reformers keep on reiterating that "there is but one really trustworthy proof that death has occurred in any given instance—namely, the presence of a manifest sign of commencing decomposition." It follows that the compulsory viewing of a body by a medical practitioner must continue in each case until such decomposition is actually evident, and that only on certification that this has occurred can burial or cremation be allowed. Nothing short of this can satisfy Sir George Greenwood's requirements, but it is probable that the general common sense of the public will rest secure with the really adequate protection which the law now affords.

[1] *The Law of Death Certification.* By Sir George Greenwood. Oxford Medical Publications. London: Milford, Oxford University Press. 1928. (5¼ × 8½, pp. x + 83. 1s.)

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY.

IN our issue of October 27th, 1928 (p. 760), we announced that, under the patronage of the King, the fifth International Congress of Military Medicine and Pharmacy would be held this year from May 6th to 11th at the British Medical Association's House in Tavistock Square. Previous conferences were held in Brussels in 1921, in Rome in 1923, in Paris in 1925, and in Warsaw in 1927. At the forthcoming congress will be discussed the evacuation of the sick and wounded by water and by air, together with the function of the medical services in combined operations; tropical fevers of short duration; wounds of blood vessels and their sequels; the physical and chemical analysis of glass and rubber articles employed by the medical services; and the standard of dental and physical fitness in the various military services. At the exhibition of surgical appliances, instruments, drugs, and of equipment used by the medical officers of the Army, Navy, and Air Force, to be held in connexion with the conference, will be demonstrated a device whereby medical officers may be enabled to ascertain the degree, and, within limits, the cause of the unfitness of candidates for the Air Force. All members of the British Medical Association in the metropolitan area are cordially invited to attend the exhibition.

INFLUENZA.

IN the week ending March 9th there was a slight decrease in the number of deaths attributed to influenza in the great towns of England and Wales; the total fell from 2,183 to 2,127. In the Midlands and Yorkshire the rate of mortality was still increasing, but in other parts of England the maximum had been passed. The notifications of pneumonia tell the same story. To judge from the rates of mortality and morbidity (from pneumonia), the West Midland area—particularly Birmingham—has suffered more severely in the present recrudescence than any other part of England. In the week ending March 9th the notification rate of pneumonia per 100,000 reached 302.7 in the West Midland area, double the rate in London in the week of maximum (151.4) and much greater than the maximum for the North-Western area (206.1). The rate in Yorkshire is intermediate between that of the Midlands and the North-West, but may not yet be at a maximum. In the North the rate is declining and in the week of maximum was nearly the same as in the worst week of the North-West. It would seem that a decline has begun, although several weeks are likely to pass before mortality is normal.

MEDICAL RESEARCH COUNCIL.

ANNUAL REPORT.

I.

EACH year the report of the Medical Research Council contains so much material that it becomes increasingly difficult to continue the practice of giving an outline of some of the most important aspects of the work carried out under its direction. The report for the year 1927–28 is actually a little larger than last year's, and while no startling new discovery is described within its covers it is a record of steady progress in many branches of research. The sum of £148,000 was provided by Parliament during the financial year, and it is very satisfactory to note that important additions to the available resources have again been made this year by the generosity of private benefactors and various public bodies. Of the total expenditure, the costs of office administration and scientific organization, including travelling expenses for members and officers of the Council, have not exceeded 6 per cent., despite the fact that no free services are supplied by the Post Office, H.M. Stationery Office, or Office of Works. Co-operation with research organizations throughout the Empire, referred to in last year's report, has this year been largely attained. In the autumn of 1927, at the request of the Government of India, the secretary of the Medical Research Council, Sir Walter Fletcher, visited India on leave for five months. While there, he served as chairman of a committee appointed to report upon the organization of medical research in India.[1] This committee did very valuable work, and was able to attend the triennial Congress of the Far Eastern Association of Tropical Medicine, held in Calcutta in December, 1927. The secretary was also able to visit other centres in India, and was especially interested in the possibility of interchange of workers with such organizations as the Indian Research Fund Association. Another circumstance which has aided the progress of Empire co-operation was the visit during the last two summers of Professor Lyle Cummins to South Africa at the invitation of the Tuberculosis Research Committee of the South African Institute for Medical Research, and comparison between the methods and results of inquiries in the two countries has afforded important help to the Tuberculosis Committee, both here and in South Africa.

GENERAL SUMMARY OF RESULTS.

An indication of the Council's general policy is afforded by a study of those matters specially selected for mention and discussion in the introduction to the report. This year the Council indicates the steps whereby the treatment of pernicious anaemia by liver and liver extract was investigated at the National Institute at Hampstead, following the reports of American work, and how the co-operation of manufacturing firms was obtained for getting an adequate supply of liver extract for extensive clinical trials. The Council reported upon these investigations, and supplies of the extract were then made available through the ordinary commercial channels by the firms interested. On the subject of treatment by artificial light the report observes that large sums of public and private money are being expended on the provision of artificial sources of ultra-violet radiation while there is no scientific reason to suppose that the treatment of rickets is better effected by ultra-violet rays falling on the skin than by the direct provision of the necessary food values. In fact, states the Council, "it commonly costs three or four shillings to give by light an effective supply of vitamin D that would cost less than a penny if given by the mouth in the form of cod-liver oil or otherwise." Artificial sunlight is used for the treatment of various conditions other than rickets, but careful control work seems to indicate that results are largely negative. During the winter months 1927–28 Dr. Dora Colebrook, in conjunction with the medical officer of health for Willesden, Dr. Buchan, and with the approval of the Board of Education, carried out a scientifically controlled trial of the effects of light upon children at school. A report on these results is now in the press. It appears that the results of the light treatment were wholly negative. There was no greater gain in weight, height, mentality, or "spirits" in the children who received light treatment, and they actually suffered a greater incidence of minor ailments than the rest. There is likely to be a great deal of discussion about this section of the report, and further study seems to be necessary before passing final judgement. Nevertheless, in the opinion of the Council, many of the claims for photo-therapy are fantastic, and "it seems fair to suspect that in much of the present advocacy of light treatment the results *post hoc* are accepted as *propter hoc*."

On the subject of radium and cancer the introduction reviews the progress since 1920, when the Council was entrusted by the Government with 2½ grams of radium. "It is not too much to say that the outlook has been quite transformed in that time." It is true that progress has taken place more at some centres than at others, but everywhere there has been improvement in methods, especially in working out the radio-surgical technique of access. It is maintained that for cancer of the cervix and for certain types of cancer of the tongue radium treatment is as efficient as the knife, without entailing nearly the same risk and suffering. Radium treatment in many centres has still to win its way from the inoperable to the operable types of cancer, but the Council believes that the present policy of using every centre both for treatment and research will eventually lead to the evolution of sound methods of treatment. Finally, the introduction refers to the forthcoming publication of a "System of Bacteriology" in nine volumes.

WORK AT HAMPSTEAD.

Thanks to a bequest made to the Council by the late Right Hon. Lord Justice Ronan, K.C., of Dublin, which defrays the whole of the expense, it has been possible to extend the building of the National Institute for Medical Research, and the new annexe, to be known as the Ronan Building, is to be ready for occupation in the spring; Dr. H. H. Dale has been appointed director-in-chief of the institute. In the department of biochemistry and pharmacology work has been specially directed to the subject of histamine and allied substances, and the work has been extended to the study of an unstable choline ester obtained from the spleen of certain animals. Dr. Rosenheim and Mr. T. A. Webster have continued their investigations into the production of vitamin D by the irradiation of ergosterol, and so far have been unable to produce the vitamin by treatment of other sterols or allied substances. In the pathological section the chief work has again been a study of diseases due to filter-passing "viruses." Captain Douglas and Dr. Wilson Smith have studied generalized vaccinia in rabbits, and Dr. Perdrau has made a special study of vaccinia, dealing with the particular form of encephalomyelitis which has on occasions been found in association with vaccinia. His observations reinforce the view that post-vaccinal encephalitis is not directly due to the vaccinia virus, but that on rare occasions in certain individuals the vaccinia may enable an unknown factor, perhaps another virus, to produce the encephalitis. Mr. I. A. Galloway has continued to work at Hampstead on behalf of the Foot-and-Mouth Disease Committee of the Ministry of Agriculture, and various problems in the immunology of foot-and-mouth disease have been studied. Mr. Dobell has continued his study of the intestinal protozoa of monkeys, and his work upon *Entamoeba histolytica* has been extended so that various stages in its life-history have now been described for the first time. It has been found that one part of emetine in five million parts of culture medium will kill the organism in certain experiments. In the department of applied optics the work of the past year has been mostly concentrated on technical problems arising in the study of filterable viruses, and the results now obtained by using ultra-violet light constitute a definite advance. In association with Professor Topley of the London School of Hygiene, photographic observations have been made of the "bacteriophage." Mr. T. C. Angus, in the section of applied physiology, has continued his investigations on the sources of ultra-violet rays. He worked out the dosage and superintended the installation of the lamps used at Willesden in Dr. Colebrook's experiments. Dr. Leonard Hill has been continuing his work on

[1] See *British Medical Journal*, December 1st, 1928, p. 1001.

the blood pressure in the capillaries, especially those of the liver, and has concluded that about half the systolic pressure in the arteries is spent in maintaining the velocity of blood flow. With Captain Douglas and Dr. Wilson Smith, Dr. Hill has investigated the effect on droplet infection of spraying a room with antiseptic solutions, and it is concluded that the use of such sprays in public rooms is justified.

Biological Standards.

Since the Therapeutic Substances Act came into force in August, 1927, there has been much work of an expert and advisory kind for the Standards Department of the National Institute. A systematic survey of the different scheduled substances already on sale in this country under licence has been initiated. This year has also seen the completion of the preparation and testing of the standard tuberculin, which has been adjusted in strength to the closest possible identity with the standard originally created by Ehrlich at Frankfort. The Standards Department has also been able to devote some time to substances not yet scheduled. For example, the difficulties involved in the standardization of scarlatina antitoxin have been to a certain extent elucidated by the work of Dr. Hartley. So far he has been able to measure, with some accuracy, the lethal dose of the toxin for the rabbit, and the practical application of his work to the standardization of antitoxin seems to be in sight. Again, an international standard for digitalis has existed for some time, and in response to a demand from British manufacturers the department is preparing an accurately assayed mixture which will be available to such British manufacturers as require it, in advance of legal control. Work in the production of standard cultures and serums has continued, and the demand for these has been maintained. In view of certain criticisms of the Widal test, Dr. Gardner has investigated the problems which have arisen in connexion with this reaction in persons who have been inoculated against typhoid fever, and specially sensitized suspensions of organisms are now available for use in these cases. An epidemic of infectious jaundice among school children in Oxford has been investigated, and while it was negative as far as finding the *Leptospira icterohaemorrhagiae* was concerned, it revealed that 50 per cent. of the local rats were harbouring this organism.

Experimental Medicine.

Work in various clinical units throughout the country has been supported by the Council, mostly by the provision of part-time workers. At University College, under the direction of Sir Thomas Lewis, observations on the peripheral circulation have been continued, and Dr. Harris and Dr. Marvin have brought forward conclusive evidence for the first time that the minute vessels of the skin in the mammal are under the direct control of the sympathetic nervous system. Observations upon itching have also been made, and it is concluded that this symptom is due to stimulation of the sensory nerve endings by histamine or its equivalent. Drs. Grant, Wood, and Jones have investigated the irregularities present on the valves of the heart in relation to the infection which occurs in subacute bacterial endocarditis. They suggest that irregularities of surface play a much less important part than the formation of small platelet thrombi. At St. Thomas's Hospital the work of the medical unit under Professor Hugh MacLean has been mostly concerned with various aspects of the physiology of digestion. The generally accepted theory of regurgitation of alkaline intestinal contents into the stomach has been shown to be no longer tenable, and it has been demonstrated that the stomach possesses a self-regulating mechanism for acid. It has also been shown that the secretion of pepsin bears little relation to the amount of acid present in the stomach. Drs. Gardiner-Hill and Forest Smith have continued their work on the clinical condition associated with some of the endocrine disorders. At St. Bartholomew's Hospital, under Professor Fraser, the medical unit has conducted a considerable amount of work of a biochemical nature. Drs. Linder and Carmichael have shown that the reduction of the chlorides in the cerebro-spinal fluid in cases of meningitis accompanies a corresponding decrease in the arterial blood serum and is not due to changes in the meningeal permeability. Professor Fraser, Dr. Linder, and Dr. Hilton have made observations on the circulation rate in man by a modification of the Fick principle. At Sheffield Professor Mellanby has continued his experiments to determine the chemical properties and the nature of the substance present in cereals which interferes with the calcification of bone. It has been shown that in this respect oatmeal is the worst and white flour the best of cereal products, and in the course of his work Professor Mellanby found that ergot had a decided antirachitic action, which is of interest in that as far back as 1889 Tanret first isolated ergosterol from ergot, and vitamin D must also have been obtained at the same time. At St. Andrews Dr. Rowand has made a further investigation into the occurrence of albuminuria in children, and he has also investigated the occurrence of respiratory catarrhs and the condition of the tonsils and adenoids in children of pre-school age. It is anticipated that these studies will eventually allow some valuable generalizations to be made.

Child Life.

Problems of the toxaemias of pregnancy have been investigated by Dr. O. L. V. de Wesselow at St. Thomas's Hospital. He has been occupied in a study of the blood volume and its relationship to the plasma protein content in the toxaemias of pregnancy in nephritis and hypertension. Work at Glasgow under the general direction of Professor L. Findlay on the metabolism of infants has been continued. Drs. Graham and Morris have been investigating the acid-base equilibrium with special reference to respiratory and gastro-intestinal disorders. Under Professor L. G. Parsons at Birmingham investigations into some aspects of the biochemistry of acute rheumatism have been continued, and, taken on the whole, the results indicate that the acid-base balance of the blood of rheumatic children is very little different from that of normal children. The work at this centre on coeliac disease has been continued, and the research has concerned itself chiefly with the source of the fat in the faeces. The evidence so far obtained points to the fat being unabsorbed food fat. At University College Dr. H. A. Harris has confirmed his views with regard to the role of vitamins in bone formation, and in Manchester Dr. A. A. Mumford has conducted an inquiry to determine whether, by the use of body measurements and physiological tests, any constant relation can be discovered between the varieties of physical build commonly found among adolescent schoolboys and the various physical activities and aptitudes which these boys display. Drs. Davies and Lightwood are investigating some of the factors concerned in the production of acute rheumatism in children under the age of 16, and Dr. Carey Coombs is supervising collective research on similar lines in Gloucestershire, Somerset, and Wiltshire.

Human Nutrition.

Under this heading last year some mention was made of an important investigation at St. Andrews. This involved inquiries into the dietaries of 159 households of all classes, carried out over a period of a week, and repeated for 35 households six months later. As St. Andrews is a non-industrial town this investigation has been supplemented by work at Cardiff, where the diet of some sixty households has been the object of study. Work on the importance of iodine in foodstuffs has been carried out at Aberdeen by Dr. A. B. Orr and Dr. I. Leitch. The report on this work has already been issued by the Council, and was noticed in these columns on February 16th (p. 307). With funds supplied by the Empire Marketing Board the Council has investigated the vitamin content of fruit, vegetables, and dairy products in relation to conditions of production, transport, and preservation. Dr. Zilva has been studying the mechanism of the inactivation of the active principle in lemon juice, and with Mr. Hoyle has undertaken an extensive inquiry into the antiscorbutic factor in apples grown in this country and stored for various periods under carefully controlled conditions at the Low Temperature Research Station, Cambridge. The behaviour of vitamins in butter and margarine kept in storage has also been studied.

(To be continued.)

TOXICITY TESTS FOR NEOSALVARSAN.

THE Medical Research Council has just issued a full report[1] of the inquiry conducted by Miss Florence M. Durham, Dr. J. H. Gaddum, and Mr. J. E. Marchal into toxicity tests for novarsenobenzene, concerning which Dr. H. H. Dale, F.R.S., gave a preliminary account to the international conference at Frankfort-on-Main in April, 1928. The attempt to achieve international uniformity in drugs of the salvarsan series brought to light a special set of problems. Unappreciated variations, or undetected accidents of manufacture, resulting sometimes in products unduly poisonous, have long called for the subjection of each batch of these drugs to a toxicity test. A number of arbitrary tests have been evolved, lacking, however, any common basis of comparison, and with no rational basis beyond that of vague practical experience. The means to a more reasonable conformity was found in the establishment of an internationally valid standard material for each important member of the series, samples with a higher toxicity being regarded as unfit for practical use. Following the acceptance of this standard the Medical Research Council's Department of Biological Standards undertook an experimental inquiry to ascertain what constitutes a suitable toxicity test, in the course of which the assumptions common to existing methods have been examined, and in many instances proved to be unsound. In particular, the inquiry has concerned itself with the influence of variability in the most uniform stock of experimental animals, and tables of probability have been drawn up which are applicable to the effects of different practical tests for the purpose in view.

General Purpose of the Test.

It has been suggested, on the hypothesis that toxicity and curative activity vary together, that as well as an upper limit of toxicity a lower limit is required below which it should not be allowed to fall. This hypothesis gets no support from the experience of these investigators, who assume that an independent test for therapeutic potency is applied, according to the recommendations of the International Conference on Biological Standards, which met at Geneva in September, 1925. This conference recommended that every batch of the remedies in question, before issue for use on human subjects, should be tested for therapeutic potency on mice or rats infected with a suitable strain of pathogenic trypanosomes, and that before being certified as fit for general issue it should have been used on a series of human patients under the supervision of a qualified expert. The conference at Frankfort further recommended, in emendation of the technique of the test proposed at Geneva, that samples of every batch should be tested for toxicity on at least ten mice or five rats, or on both, and only such preparations should be passed for issue whose toxicity under experimental conditions does not exceed the standard by more than 20 per cent.

Determination of the Characteristic Curve.

Though variations in sensitiveness to the same poisonous substances are known to occur even in a uniform stock of animals, the implications of this variability for the determination of a minimum lethal dose have not had the same general recognition. It is fortunate that the invariably lethal dose with most substances is many times as great as that which kills only an occasional animal. As a basis for practical measurement a dose must be chosen which kills a stated proportion of the animals treated, though the problem still remains of deciding what is to be regarded as a standard mortality. A lethal dose, as J. W. Trevan[2] suggests, can only be accurately stated as a proposition in probability. The larger the number of animals of a given stock which can be used in each investigation of a standard substance in a series of doses, the more closely will the experimental curve relating death rate to dosage approximate to the theoretical death-rate curve which can be given by an infinitely large number. When such a "characteristic toxicity curve" has been determined the death rate for any particular dose can be read off from it, and the probability that the actual death rate observed in a particular dose will differ from the theoretical death rate by not more than a specified amount can be stated numerically. Conversely, when an unknown quantity of poison has killed a certain proportion of experimental animals, the probability that the dose used differs by not more than a specified amount from the theoretical standard dose producing that death rate can also be estimated. With the data needed for the construction of a characteristic curve the investigators were able to decide on the dose and on the number of mice that had to be injected in order to obtain an accurate measure, within the defined limits, of the toxicity of the drug under examination. The ideal test would obviously be that which, on the one hand, allows every substance to pass if its real toxicity does not exceed that of the standard by more than the agreed proportion, and which, on the other hand, condemns every sample whose real toxicity exceeds the agreed limit. No practical test which passes every sample with a 20 per cent. excess will also inevitably reject every sample with a greater toxicity. It was found, however, that a test could be chosen which would pass a high proportion of drugs having a 20 per cent. excess and reject a high proportion of those in which the figure reached 30 per cent.

To eliminate any effects of variation in sensitiveness among different batches of mice injected on different days, and of variation in quality among the contents of different ampoules, the procedure was to take on one day a batch of mice and to inject an equal number with a range of doses made from one ampoule, and to repeat this until the required number for each dose had been injected. The dose for each mouse was calculated, in milligrams per gram, from its fasting weight, and the solution had a uniform strength of 2 per cent. All injections were made intravenously, and deaths occurring in the three following days were recorded. The first characteristic curve was obtained with mice taken at random, no attempt being made to choose mice of uniform stock or weight. The curve obtained could be regarded as giving only a general indication of the relation of doses to death rates. Further curves were made, using mice of approximately the same age, bred entirely from the laboratory's stock and selected so that their weights all fell within the limits of 18 to 20 grams. In view of the finding that, when the dose injected into each mouse was proportionate to its weight the mortality among small mice was lower than among large ones, a further experiment was undertaken, which established a relationship between dose and weight. Another fact observed was that the percentage mortality among female mice was invariably about 8 to 10 per cent. higher than among males. The investigators emphasize the fact that the curves they obtained relate only to mice of their own laboratory strain, and that each testing centre should therefore construct its own standard curve with mice resembling as much as possible those which would be used in routine tests.

Use of the Characteristic Curve.

The object of the test is not to determine toxicity, but simply whether or not the toxicity exceeds a certain maximum above the standard. The characteristic curve shows in what range the dose should be chosen, and by simple calculations from the available data it is possible to determine how many animals should be injected with that dose and what maximum should be fixed for the permissible death rate. The statistical department accordingly drew up a series of tables indicating, for different values of the probability that any one animal will die, the probabilities that in tests on five, ten, or fifteen animals the death rate will not exceed a specified figure. From the tables the investigators were able to obtain a figure showing the percentage frequency with which the standard itself would pass any test laid down in terms of dose, number injected, and maximum permissible mortality, and were thus able to deduce that any test showing a large percentage of failures of the standard would be unduly severe in its effect on good samples. A series of graphs was prepared, based on the characteristic curve, showing how often the standard preparation, injected in various doses, would be expected to pass a test on five, ten, or more mice. Toxicity is thus stated as "20 per cent. in excess" when the usual dose injected into a number of mice produces a mortality corresponding to that which a 20 per cent. larger dose of the standard would have produced; and the frequency with which a sample having that excess toxicity will pass can be found by taking the point on the appropriate curve which corresponds to a dose exceeding by the given percentage that actually injected.

Tests at Present in Use.

Tests requiring the use of mice are official only in Britain, Germany, and Japan, and the investigators proceeded to consider the validity of each of these tests separately, and of an alternative test prescribed in the American regulations for use when the mouse rather than the rat is chosen as a test animal. The British test, as applied to material having the standard toxicity, is satisfactory, the expectation of failures being only four in a thousand; but in relation to excess toxicity the test is not as discriminating as it should be. Of batches 10 per cent. more toxic, 20 fail out of 1,000, of batches 20 per cent. more toxic, 90 fail out of 1,000, and it is not until 90 per cent. excess is reached that rejection becomes practically certain. The German test, which involves the use of a larger number of mice, is more discriminating than the British, all

[1] Reports on Biological Standards. II. Toxicity Tests for Novarsenobenzene (Neosalvarsan). Special Report Series, No. 128. 1929. H.M. Stationery Office. 9d. net.

[2] *Proceedings of the Royal Society B*, 1927, 101, 483.

batches of standard toxicity, and all but 1 per cent. of those having a 10 per cent. excess toxicity, passing the test; on the other hand, 38 out of every 100 batches with a 40 per cent. excess toxicity would still be able to pass. The Japanese test, when used with mice bred in the British laboratory, is unsatisfactory; 81 per cent. of batches with 50 per cent. excess toxicity pass the test, and it appears that a batch would have to be twice as toxic as the standard before its rejection became practically certain. The results of the American tests closely resemble those of the Japanese.

An Improved Test.

The investigators conclude that a more sharply discriminating test can be devised than any at present in use. Taking as their guide in the choice of a dose the fact that the greatest nicety is attained when the mortality rate rises rapidly with increase of dose, they find that, if 18- to 20-gram mice are used, an optimal dose is 7.6 milligrams per mouse. A 50 per cent. mortality produces the steepest curves in the above-mentioned graphs based on the characteristic curve, and thus gives the most discriminating tests. The final demand of their test is for a survival of at least 50 per cent. of thirty mice injected with 7.6 milligrams of the sample under examination. By conducting the tests in three stages, and eliminating from further tests those samples which are practically certain to fulfil the final demand and those which are certain of rejection, the number of samples requiring the full number of thirty mice is reduced to small proportions. All samples of toxicity up to the standard pass this test, and only 4 out of 1,000 fail when the toxicity is 10 per cent. above that of the standard. On the other hand, the test is unduly severe in that only 41 per cent. of material having a 20 per cent. excess of toxicity can be expected to pass it. The stringency, however, can easily be modified without sacrifice of precision by raising or lowering the standard dose and keeping the mortality constant.

Need for a Standard.

The investigators conclude by stressing the need for a uniform and practically stable standard. Comparative biological testing of any substance is possible only when a standard can be prepared and stored in such stable form that samples can be trusted to retain their value for a reasonable time after distribution. In relation to novarsenobenzene, they are convinced that such stability may be ensured with a selected and tested batch, desiccated with great care and thereafter kept at low temperature, and they suggest that the adoption of the precautions recommended by the international conference at Frankfort will soon render available a stable central standard.

Ireland.

The Four Provinces Club.

THE Four Provinces of Ireland Club held its annual banquet and ball at the Hotel Cecil, London, on March 18th, with the president, Mr. J. B. Melville, K.C., in the chair. Among the very large and distinguished gathering of Irishmen and Irishwomen and their guests were a considerable number of members of the medical profession. The chairman and others at the high table were played into the hall by Shaun O'Neill's Irish Pipers; grace was said by the Right Rev. Dr. Amigo, Bishop of Southwark; and during dinner Irish airs were played by the string band of H.M. Irish Guards. After the King's health had been honoured, the toast of "Ireland" was proposed in eloquent and sympathetic terms by Mr. Justice McCardie. The first reply was by Mr. O. Grattan Esmonde, a member of the Dail, who brought a message of congratulation from President Cosgrave; and the second (a model of its kind) by Sir William Wheeler, who reminded his English and Scottish friends that in Ireland there was a close alliance between Literature, Medicine, the Church, and the Law, all of which callings had leading representatives among them that night. If he were asked by a great insurance corporation to report on the health of Ireland, Sir William Wheeler said he would reply that she was a first-class life, and might reasonably be accepted at a reduced premium, but if asked how that health could be maintained, or even improved, he would advise against too rich a diet of undiluted Irish politics. In the twentieth century the social, scientific, and economic interests of all countries were so interlocked that an unrestricted policy of detachment from a neighbour might lead in the case of any nation to a heart-breaking process of decay. Science and letters knew no nationality and no distinction of race or of speech, but they did recognize that their contributions should be dedicated to the service of mankind, and should be worthy of the country from which they sprang. The Four Provinces of Ireland could hold up their heads in this respect. In surgery there was Berkeley Moynihan, whose forefathers came from Munster; and Hugh Rigby, born in Dublin, who had been chosen to operate on the King. Sir William Wheeler also recalled the name of Alfred Keogh, hailing from Connaught, who, as Director-General of Medical Services at the War Office during the war, was the master mind which coped with casualties amounting to almost three million on the Western Front alone. He mentioned, further, a devoted scientist screened from the public gaze, Professor John Joly of Trinity College, Dublin, who had been the force behind the discovery of how to collect radium emanations in such an economical way that they could be used in the treatment of cancer among the poor in every land. Thus science and literature and their allies ranked co-operation high above checkmate, and joined in brotherhood in the service of mankind. The concluding toast of the evening was that of "The Guests," proposed in the warmest manner by the Chairman, and responded to by Lord Justice Russell, Mr. R. D. Blumenfeld, and Mrs. C. J. Mathew, L.C.C. A small reproduction from the beautifully illuminated menu card appears on this page.

FOUR PROVINCES OF IRELAND CLUB.

County Medical Officers of Health in the Irish Free State.

Considerable progress in the appointment of county medical officers of health has been made under the Local Government Act, 1925. In co. Cork a chief medical officer of health has been appointed, with three assistants to carry on the general functions of medical officers of health under his supervision; a chief public health nurse, with six whole-time assistants, has been obtained for school inspection and tuberculosis work. In Kildare and Offaly county medical officers of health have been installed to deal with school inspection, tuberculosis, and other public health work. In counties Louth and Cork the county medical officers of health, in addition to their other duties, are pushing forward with a scheme for the eradication of diphtheria by immunization. Carlow and Westmeath have recently appointed county medical officers of health, and the question is under consideration in at least half a dozen other counties. As regards the four county boroughs, school medical services have made considerable progress in Dublin and Cork, and schemes are now being inaugurated in Limerick and Waterford. Since the appointment of county medical officers of health the notification of infectious diseases and other public health records has greatly improved. In the development of these schemes the Department of Local Government and Public Health has received considerable help from the Rockefeller Foundation.

Tuberculosis in Meath.

At a recent meeting of the Meath Board of Health a letter was received from the Department of Local Government and Public Health pointing out that immediate steps should be taken to bring into operation a suitable scheme for the treatment of tuberculosis in the county, and suggesting that the arrangements should be co-ordinated with other county health services under a county medical officer of health. Dr. Sterling Berry, medical inspector of local government and public health, who attended from the Department of Local Government, said that in 1927 the number of deaths from pulmonary tuberculosis in Meath was sixty-six, and from other forms of tuberculosis twenty-five. If they had a tuberculosis medical officer in the county no doubt a number of these cases would be discovered in the earlier stages of the disease, which was especially necessary in pulmonary tuberculosis, if they wanted to save life. In other forms of tuberculosis—surgical—even if the patient did not die as a result of the disease, he was generally crippled for life and likely to become a charge on the rates. Dr. Berry said he had been looking into some figures in connection with co. Meath, and, considering the nature of the county, some of these figures had startled him. In Meath in 1927 the figure for childbirth deaths was 3.27; in 1924, 3.27; in 1925, 5.95; while in 1926 there were fifty deaths from congenital debility and premature births in this county. In his own district, which embraced some of the poor western districts and which were not in the same category as Meath, the figures were nothing like that. The county medical officer of health would be responsible for maternity and child welfare, and for the inspection of school children. It was a statutory obligation on the county councils to have an inspector of midwives, and this duty would be undertaken by the county medical officer of health. Considering the figures he had given it was quite evident that this officer would be a great advantage in Meath. He could be chief tuberculosis medical officer and medical inspector of school children. Fifty per cent. of the salary as such was repaid by the Government, and when the officer found a child requiring dental treatment or treatment for adenoids half the cost was met, even though the children were treated in their own hospital. So far as the county medical officer of health was concerned, all the Board of Health could do was to send a recommendation to the county council, which had the responsibility of paying. But the Board of Health, as the health authority for the county, could tell the county council that they considered it was time to move in that direction. The medical inspection of school children, Dr. Berry added, was a splendid thing; they were examined by an expert, the disease was detected in the pre-tuberculous stage, and was then arrested. The section gave the Minister full power to ask the Appointments Commissioners to recommend a person in case the county council did not do so. If the county council appointed the man themselves at a salary of, perhaps £800 a year, that might be allocated on the basis of £450 as tuberculosis medical officer of health, and the remainder as school medical officer and inspector of midwives, say £500 or £600, for half-recoupment. The travelling expenses would be dealt with similarly. There was no recoupment in respect of the county medical officer of health.

General Nursing Council (Irish Free State).

At the first meeting of the newly constituted General Nursing Council Sir Edward Coey Bigger and Miss O'Flynn were unanimously elected chairman and vice-chairman respectively. It was reported to the council that the total number of nurses registered in the Irish Free State was 4,881. This number includes 3,869 general, medical, and surgical nurses, 3 male nurses, 901 mental nurses, 44 sick children's nurses, and 64 fever nurses. At the last examination held by the council in Dublin, Cork, and Waterford there were 219 candidates, 21 of whom failed. The council passed a resolution calling on the Minister for Local Government and Public Health to take such action as may be necessary to ensure the appointment to permanent posts in mental hospitals throughout the Free State of only those mental nurses who are fully trained and registered. From their number the council appointed rules, registration, finance, uniform, and badge committees. The penal cases will be considered by all the members of the council. Dr. Kelly, Dr. Leeper, and Dr. O'C. Donelan were appointed to act as an advisory committee to the council in matters connected with mental nursing.

England and Wales.

The Burrow Hill Sanatorium Colony, Surrey.

It is proposed to reopen next month the Burrow Hill Sanatorium Colony at Frimley, in connexion with a new scheme—namely, the treatment and training of tuberculous youths between the ages of 14 and 19. This colony, which is administered by the National Association for the Prevention of Tuberculosis, was originally started for tuberculous ex-service men, and now that the need for it in this respect has been met, a new field of utility is being opened up with the active co-operation of the Ministry of Health. The scheme has been approved by an order of the charity commissioners, provided that preference is given to the dependants of ex-service men. The institution will contain eighty beds, sixty of which are to be available for arrested cases of tuberculosis, while the remainder—in a specially designed block—will accommodate patients in the earlier stages of the disease. While primarily intended for youths suffering from pulmonary tuberculosis, in whom permanent arrest of the disease is ultimately likely to be secured, and who need technical education with a view to being enabled to support themselves economically, cases of glandular tuberculosis without sinuses, or of tuberculous disease of the bones and joints, will also be eligible for admission provided that active orthopaedic treatment is no longer required. Since technical education forms an essential part of the regime, only those who are physically and temperamentally suitable for it can be dealt with. This education will comprise gardening and clerical work; the course in gardening has been prescribed by the Surrey Agricultural Department, and the clerical work will be under the supervision of the Surrey Education Committee. It is hoped that the subsequent placing of the youths in employment will be effected by care committees or other organizations responsible for this kind of work; in some cases promises of employment may be obtained in advance, when efforts will be made to arrange the training of the individual so as to fit him for the particular post. The duration of residence contemplated is one year, or longer, and the inclusive cost of maintenance will be 50s. a week. Facilities will soon be available, therefore, for local authorities in England and Wales who are concerned with the long-period treatment and technical education of tuberculous youths. The Minister of Health has issued to county and county borough councils and tuberculosis joint committees a circular (969) notifying them of the establishment of this institution, and advising them to make use of it. Emphasis is laid on the importance of selecting patients who will be able to remain for as long as may be required; and the hope is expressed that the tuberculosis care committee, or other suitable organization, will charge itself with the task of finding suitable employment for patients on discharge.

Central Midwives Board.

The Central Midwives Board for England and Wales met on March 7th, when Dr. West presided. A letter was read from the acting registrar of the Nurses' Registration Board, New South Wales, asking the Board's views on a proposal to extend the period of training from twelve months to two years for pupil midwives who were not general trained nurses. It was agreed to reply that the period of midwifery training in England has only recently been increased, and that sufficient time had not yet elapsed to enable the Board to express an opinion as to the advisability of extending the period still further. With reference to a letter from the Cheshire county council—which considers the forms for keeping ante-natal

notes, as prepared by the Board, too complicated, and asking approval of one, a specimen of which was forwarded—it was decided to reply that the Board was proposing to consider, in due course, and in the light of experience, a revision of the form of keeping ante-natal notes, but that the existing form was intended for well-trained midwives, and that midwives not sufficiently well trained should be instructed in the method of using the form. Midwives who needed instruction should be advised to take their patients to an ante-natal clinic, and, if this was impracticable, arrangements should be made for a medical examination. The Board did not see its way to approve the form submitted as a substitute for the official one. A letter from the medical officer of health for the county of Southampton was considered. It was stated that a midwife had summoned a doctor for a patient suffering from "severe frontal headache" on the seventh day of the puerperium. The doctor had paid more than one visit and the medical officer of health inquired (1) whether the condition, as described by the midwife, constituted an emergency as contemplated by the rules, and (2) whether the committee would be justified in informing the doctor that, while his account would be paid on this occasion, in the event of his being sent for by a midwife in similar circumstances in future, payment could only be made for the first visit, the ground for such decision being that the condition as described was not a complication of pregnancy. The medical officer of health also suggested that Rule E 21 limited the operation of Rule E 20 to cases which were direct complications of pregnancy and confinement, and asked for the Board's opinion on the point. It was resolved to reply that, inasmuch as the Board had always held that Rule E 20 applied to *all* cases of illness or abnormality occurring during pregnancy, labour, or lying-in, without being restricted in any way by Rule E 21, the Board was of the opinion that the condition referred to in the letter was an emergency within the meaning of Section 14 of the Midwives Act, 1918. The question of payment of fees to doctors under Section 14 of the Midwives Act, 1918, was one for the Minister of Health and not for the Board to decide. Dr. Fairbairn and Dr. Lyster reported on their inspection of the new maternity hospital in Wolverhampton, and on the question of midwifery training there. It was decided that the recommendations of the report should be communicated to the hospital, and that the observations of the hospital authorities thereon should be invited.

Conference on High-grade Milk Production.

A conference is to be held at Reading on April 16th and 17th, under the auspices of the Certified and Grade A (Tuberculin Tested) Milk Producers' Association, for the discussion of matters of mutual interest to those concerned in the production of the highest grades of milk. The chairman of the conference on the first day will be Sir George Newman, Chief Medical Officer of the Ministry of Health, and on the second day Professor Frederick Hobday, principal of the Royal Veterinary College, London. The mornings are to be devoted to papers and discussions, and the afternoons to visits to producers' farms and the premises of distributors in the district, as well as to the University farm and the National Institute for Research in Dairying. The subjects for discussion include the progress of the movement for graded milk in England and Wales, Scotland, and Northern Ireland, the production of tuberculin-tested milk in Holland, the use of milking machines, the variation in the fat content of milk, and the relative values of milk raw and heated. Among the readers of papers are Professor Stenhouse Williams, Dr. R. M. F. Picken, medical officer of health, Cardiff, and Major G. W. Dunkin, of the National Institute for Medical Research, who is to speak on the tuberculin test. The authorities of Reading University are actively co-operating by allowing the conference to be held at the University, and by placing hostel accommodation at the disposal of the visitors. The honorary secretary of the convening association is Lieut.-Colonel C. Maddock, M.D., D.P.H. (Foxglade House, Shinfield, Reading), to whom any communications should be made.

District Nursing in London.

Steady extension of the work of the Central Council for District Nursing in London is a prominent feature of the report of the council for 1928. Notable improvements have been effected in South London, and better nursing arrangements are being made in the new London County Council estate within the Hendon Urban District. A new association has been started in Middlesex for Sunbury, Upper Halliford, and Charlton, in affiliation with the Queen's Institute; this association will be conducted on a provident basis, the payment of 2d. a week being asked. The appeal fund was closed in October, 1928, the amount received being £1,700. About half this sum was distributed last July in order to maintain the amount of awards to associations at the level of recent years; the remainder has been placed on deposit. An appeal for help to King Edward's Hospital Fund was unsuccessful. The total awards made to district nursing associations in 1928 amounted to £4,443, including the sum received from the appeal fund. In addition to the £3,000 entrusted to the council by the trustees of the London Parochial Charities, £400 was also given by these trustees for the administrative work of the council, and £100 was granted for bursaries. Contributions were also received from the Worshipful Companies of Drapers, Cloth Workers, and Skinners, the Society of Apothecaries, and the Peabody and Guinness trustees. A sum of £533 was paid through the council by the Ministry of Health in respect of midwifery and maternity nursing undertaken by certain associations. The British Medical Association is represented on the central council by Mr. Comyns Berkeley, Dr. William Paterson, and Mr. H. M. Stratford.

Arrangements for Dealing with Venereal Disease in London.

The proposed arrangements for the diagnosis and treatment of venereal disease in London for 1929–30 were placed before the London County Council on March 12th. Seventeen general and six special hospitals now undertake in-patient or out-patient and other work under the scheme, and all-day clinics have been provided at St. Thomas's, Guy's, the Royal Free, and St. Paul's Hospitals. An all-day clinic at the London Hospital is expected to be available at an early date, and another at the West London Hospital is in course of construction. Six hostels are also included in the scheme. The county of London, for the purposes of these arrangements, is joined by certain neighbouring authorities—namely, the councils of the counties of Buckingham, Essex, Hertford, Kent, Middlesex, and Surrey, and the county boroughs of Croydon, East Ham, and West Ham. During 1928 the number of new cases which came forward was 25,996, of which, however, 9,595 were found to be not venereal. The number of venereal cases (16,401) shows a decline on preceding years; the average for the years 1924–27 was 18,077. Of the new cases in 1928, those of syphilis numbered 5,270, of gonorrhoea 10,896, and of soft chancre 235. It is pointed out that these figures are not the full measure of the extent to which venereal disease came under treatment in London, as a not inconsiderable number of cases received treatment by general medical practitioners. The number of bacteriological specimens examined at the hospitals at the request of, and free of cost to, practitioners in all areas was 29,406, and 459 practitioners are on the approved list for the free supply of salvarsan or its substitutes. The total expenditure estimated for 1929–30 is £108,760, of which 83 per cent. represents London's proportion, and 17 per cent. that of the participating authorities; three-fourths of the expenditure is recoverable by Government grant.

Royal Bath Hospital, Harrogate.

Presiding at the one hundred and third annual meeting of the Royal Bath Hospital and Rawson Convalescent Home, Harrogate, Viscount Lascelles commented on the need for spending more money on research with a view to preventing rheumatic complaints. The annual report of the committee of management showed that the progress of the institution had been steady and satisfactory. The most urgent needs were the provision of an

electric lift and of a suitable theatre for minor operations of an orthopaedic nature so as to deal more efficiently with serious cases than was at present possible. Special donations were invited for these urgently needed extensions, which were only being delayed for lack of money. Other requirements were an *x*-ray plant and facilities for occupational therapy. The treasurer reported that the hospital balance sheet showed a profit on the year's working of about £500, and the Home a profit of £117. The laboratory account revealed a substantial deficit, and the treasurer emphasized the importance of obtaining an endowment of between £8,000 and £10,000 to provide the necessary income in this respect.

Correspondence.

A COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS.

SIR,—Dr. Herbert Spencer's letter (March 16th, p. 523) has appeared at a critical moment in the history of a great endeavour to establish a British College of Obstetricians and Gynaecologists—at the very moment, in fact, when we are presenting our case, and the objectors theirs, to the judgement of the Board of Trade, at which an inquiry is to be held on Friday, March 22nd, the day on which this issue of the *British Medical Journal* will be published.

I am sure Dr. Spencer's intention is not to put a spoke in our wheel, but merely to represent the other side of the case, which, in various forms, has been laid before us during our deliberations extending over a period of four years, and which has been rejected by us as being apprehensive rather than apprehending.

It is clear, I think, that Dr. Spencer is as anxious as the rest of us are about the present unsatisfactory position of obstetrics and gynaecology—a science limited no longer (in the language of the Chinese) to the "regions below the belt," but embracing many aspects of medicine and surgery, to both of which, indeed, it has itself largely contributed. Nevertheless, physicians and surgeons in the past (there are many enlightened exceptions to-day) have treated gynaecology and obstetrics rather disdainfully as an offshoot, and not as a partner of equal rank.

Our art, which is as old as theirs, and which has also attained to the position of a high biological science, has become differentiated, and cannot any longer be absorbed or suppressed in the progress of evolution: it has its own individuality and ideals, which must find expression at the hands of its own exponents. But while Dr. Spencer seeks to find alternatives to the formation of a new college, and suggests that the various objects we have in view fall within the province of the Obstetrical Section of the Royal Society of Medicine, the medical press, and the Royal Colleges of London, the fact remains that in a period of very many years these alternatives have not materialized. Dr. Spencer evidently has missed what seems to be the reason—namely, unified and concerted effort is necessary to obtain great results. All the bodies mentioned have undoubtedly rendered great service to one cause or another, but none of them has lifted, or, I suggest, has seriously tried to lift, obstetrics and gynaecology from the rut along which it would have travelled indefinitely if it had not been idealized and raised to its present position—academic and practical—by ardent votaries.

At present there are many gynaecological and obstetrical societies scattered throughout Great Britain which are doing work no less valuable than that of the Section devoted to this subject at the Royal Society of Medicine; there are, moreover, colleges elsewhere as important in the eyes of their disciples as are the London colleges in the opinion of those of us who have the honour of belonging to them. The time has now come when the various scattered groups of obstetricians and gynaecologists, while remaining attached and loyal to their own colleges and societies, should bind themselves together in one corporate body to advance their specialty. That, then, is the real issue. Are we to be content with playing for our counties only, or may we not aspire to constitute from our county membership an M.C.C. to represent not only London, but the whole country?

This is not the place, nor is the present the proper time, to go into the arguments and details which will be carefully considered in a few days' time; but I wish, in closing, to make clear the fact that, if we succeed in our application, we shall all fully realize that there are before us long years of spade-work and probation, during which we shall try not only to justify our existence, but also by discipline, hard work, and vision to create a great tradition, and to acquire a home, a library, and that financial status the value of which Dr. Spencer by no means overestimates.—I am, etc.,

W. BLAIR BELL,
Chairman of the Council of Signatories of the proposed College of Obstetricians and Gynaecologists.

Liverpool, March 16th.

P.S.—I regret that time and distance have not allowed me to consult any of my fellow signatories, or to obtain their valuable co-operation in drafting this letter, but I have endeavoured briefly to express in a general way views which, I believe, we hold in common.—W. B. B.

COLLES'S FRACTURE.

SIR,—The discussion in your pages on Colles's fracture grows more complicated each week, as each contributor puts forward a new suggestion, whilst the general principle essential to success in the treatment of any fracture is being overshadowed. Every writer agrees that perfect anatomical reduction is essential, but not one has mentioned the only possible way in which this can be ensured. It matters not what manœuvre is practised—whether the ulna is pushed backwards or the radius forwards—whether one uses one's hands or a wedge—whether one prefers gas or ether—provided that the success of the manœuvre is proved by the immediate post-reduction *x*-ray examination through the splints.

Whether Mr. Bankart agrees or not as to the possibility of reduction by Sir Robert Jones's method under gas anaesthesia, the fact remains that at the Liverpool Royal Infirmary over 400 cases a year are being successfully treated by this method by house-surgeons and house-physicians. But it must be emphasized that the house-surgeon's treatment is controlled, and that every case without exception is returned for a second *x*-ray examination, and inspected the following morning at the daily fracture clinic by the orthopaedic surgeon. If the position is not absolutely perfect the fracture is again manipulated and *x*-rayed as frequently as may be necessary to secure anatomical perfection. Not until then is the patient transferred to the weekly clinic.

In this way the house-surgeon gains as much experience as he wishes, and yet treatment is so controlled that our follow-up clinics show that in 80 per cent. of our cases it is difficult or impossible after twelve months to distinguish the fractured from the normal wrist. These results are secured by the routine described by Sir Robert Jones, except that I always teach house-surgeons to use the manipulative manœuvre in its two component parts, the backward displacement and tilt being corrected by one movement, and the outward displacement by a second. Unless these are practised individually and separately there is a tendency to leave the outward displacement slightly under-corrected, so producing a bad cosmetic result owing to radial deviation of the hand, and a bad functional result owing to arthritis of the lower radio-ulnar joint. A pad over the back of the distal fragment and one over the front of the proximal fragment, with two gutter splints of aluminium, the posterior extending to the knuckles and the anterior falling short of the thenar eminence, provide an entirely adequate, simple, and comfortable method of immobilization.

But individuality is the keynote of surgery, and such details are of no significance as compared with the three essential principles: (*a*) anatomical reduction proved by *x*-ray examination; (*b*) immobilization for a month; (*c*) full finger movement from the first day.—I am, etc.,

Liverpool, March 17th. R. WATSON JONES.

SIR,—The discussion on Colles's fracture at present taking place in the *Journal* must be of extreme interest to the profession. Anything that can help in overcoming or lessening the disability must be welcome to both the doctor and patient. This is my reason for adding to the discussion a simple line of treatment I have adopted to all fractures for some time past—namely, three-quarter to an hour's massage (by a masseuse) immediately before any attempt is made to reduce the fracture. It is very striking how easily a Colles's fracture can be disimpacted and completely reduced without causing pain to the patient.—I am, etc.,

Bath, March 12th. JOHN S. LEVIS.

ENLARGEMENT OF THE PROSTATE.

SIR,—The valuable discussion which has taken place in your columns recently has had its scope widened by the interesting letter from Mr. Andrew Fullerton (March 2nd, p. 417). I wish to support wholeheartedly this writer's statement regarding the use of an indwelling catheter. The two-stage prostatectomy has been unknown in my practice for several years. I could instance case after case similar to those cited by Mr. Fullerton and bearing out his claims, where men suffering from chronic urinary retention, and showing dry, furred tongues and parchment-like complexions, together with a high blood urea and all the other evidences of chronic uraemia, have recovered their health within a week or ten days sufficiently to undergo a successful prostatectomy. It is a constantly recurring experience to have patients admitted with a blood urea of 80 to 100 mg., and to watch this figure fall within a week or so to the neighbourhood of 40 mg., with a corresponding improvement in the patient's appearance and in his sensation of well-being, this resulting solely from the employment of an indwelling catheter. It should be observed, however, that the catheter must remain in the bladder. Similar results cannot be obtained by passing the instrument two or three times daily, as is done by some surgeons. During this period the bladder is irrigated twice or thrice each day, and on each occasion two ounces of mercurochrome are clamped in the viscus for a quarter of an hour and then released. Though some sepsis may occur in spite of these precautions, I maintain that it is materially less than that caused by a preliminary suprapubic drainage, and that those who fancy they can reduce cystitis prior to prostatectomy by that preliminary operation deceive themselves.

The simplicity of the procedure, the avoidance of a duplicate operation, and the incomparable blessings of a clean field for the main operation are notable assets. Moreover, the mortality during this drainage period is very small and compares very favourably with a definite death rate which I know to occur in the practice of those who do the double operation.

The employment of a finger in the rectum should be abandoned. It is unnecessary, and it is dirty. Even if two gloves are worn, as recommended, and the upper one is changed, the sleeve is nevertheless soiled. Nor is it desirable to remove the glove from the enucleating hand. The prostatic adenoma in the vast majority of instances forms an incomplete collar encircling the urethra in its posterior four-fifths. If the enucleating finger is gently passed into the prostatic urethra it will easily detect the anterior limit of this collar (anterior end of lateral lobe). The force required to commence enucleation at this point is so slight that the gloved finger can accomplish it without tearing the glove. This is not the region described by Freyer, nor, indeed, by many subsequent writers, but it nevertheless gives the quickest and easiest access, and merits the attention of any who have not yet tried it. Some of them will not then find it necessary to devise excuses for the use of the naked hand.

I agree with Mr. Fullerton that Sir Henry Thompson's dictum that enlargement of the prostate does not occur before the age of 50 requires revision. I have myself operated upon three cases below that age, and know of at least two others operated upon by other surgeons. Moreover, the number of men who present themselves suffering from the results of prostatic hypertrophy within a year or so of reaching the half-century has recently impressed me considerably, symptoms having occurred in not a few prior to reaching that milestone.—I am, etc.,

Manchester, March 12th. JAMES B. MACALPINE.

CYCLICAL VOMITING.

SIR,—In the report of the discussion upon the chronic dyspepsias of childhood at the Medical Society in your issue of March 16th (p. 502) Dr. Reginald Miller is reported as quoting a statement of mine to the effect that 30 per cent. of hospital children suffer from cyclical vomiting. There is even a footnote giving a reference to page 185 of your issue of February 2nd, which might lead the reader to suppose that Dr. Miller had found such a statement in some writing of mine.

I do not know the frequency of cyclical vomiting and have never made any attempt to state it. I certainly see numerous cases at the hospital, but then a good many are sent to me specially because my friends know I am interested in this particular disorder. Even so, the total is nothing like 30 per cent. of all the cases I see.—I am, etc.,

London, W.1, March 18th. H. CHARLES CAMERON.

LOCAL ANAESTHESIA IN OPERATIONS FOR HAEMORRHOIDS.

SIR,—Dr. T. H. T. Barber's paper in your issue of March 2nd (p. 397) and the subsequent papers by Sir William Wheeler and Mr. W. B. Gabriel should help to popularize a now well-established method of producing anaesthesia for operations upon the rectum and anus. I would like to sound a note of warning in case the incautious use of this method by those who are not well accustomed to local anaesthesia should result in accidents and tend to discredit local anaesthesia in these cases.

Both novocain and adrenaline are very safe drugs unless they are inadvertently injected into a vein; if this should happen even very small doses will cause most dangerous symptoms. The anal region is particularly rich in large veins, and it is most important that care should be used to avoid injecting the solution directly into the venous plexuses. My own practice in using local anaesthesia in operations for piles or fissure is to inject a 1 per cent. solution of novocain under the skin round the anus, starting at the posterior commissure and working forward on both sides till the whole anal cutaneous margin is anaesthetized, and then to pass the needle into the external sphincter guided by a finger in the rectum. The sphincter is very easily anaesthetized in this way and will quickly relax. A further injection into each ischio-rectal fossa will ensure complete anaesthesia of the whole region and allow of the rectum being properly washed out and sterilized, without which no operation upon the rectum is justified.

Personally I prefer not to use adrenaline at all, as I consider that it is more dangerous than novocain should it accidentally get into a vein, and quite excellent anaesthesia can be obtained without using it. I am sure that many accidents attributed to cocaine and novocain have in reality been due to the adrenaline added to them.—I am, etc.,

London, W.2, March 15th. J. P. LOCKHART-MUMMERY.

SIR,—In reply to Sir William Wheeler's letter, on March 9th, regarding my article, which was published on March 2nd (p. 397), I am very gratified to note that he fully supports my thesis by his own valued experience, and that he agrees with my own findings as to the superiority and advantages of local anaesthesia *versus* a general one for these operations. I also observe that he gets equally good results by the use of a simpler method of injections, but that he does not approve any stretching of the external sphincter, and attributes some of the after-pains to this practice.

I quite agree that, for purely operative measures, the complete relaxation obtained at the time of the operation

by the injections is all that is required, but I think that physiological rest for the parts for some days is necessary, and can best be obtained by induced temporary paralysis or abolition of tonicity by stretching the sphincter ani. For the cure of simple non-complicated fissures this may be all that is required. Frequently I have performed a dilatation operation at a nursing home in the morning, the patient returning to his own home the same evening without complaining of pain, and, when necessary, taking up his occupation on the following day. From these experiences I personally do not find that dilating the sphincter materially increases after-pains. With careful dilatation retention of urine should not occur.

Cutting, or the removal of any skin, is, I think, the chief cause of after-pains, and, in complete accordance with Sir William, I believe that no skin should be removed, that no raw surface or edge should be left unsutured, and that careful suture tends not only to lessen after-pain, but prevents spasm, post-operative haemorrhage, and infection.

Butler, in his *Textbook on Materia Medica, Therapeutics, and Pharmacology* (p. 392), says: "Antipyrine . . . analgesic and local anaesthetic. As an analgesic it probably ranks next to opium. The anaesthesia produced by antipyrine lasts for several hours or even days." Perhaps my employment of antipyrine—in vaseline—freely in all cases of simple dilatation, or after any kind of operation on the anus or rectum, may in a great measure be responsible for the minimum of after-pains noticed in all these cases.

Mr. W. B. Gabriel (March 9th, p. 474) draws attention to a very important point—namely, that no perianal swelling or oedema is seen after local anaesthesia (as contrasted with general narcosis), because there is never any vomiting. These complications may be the source of considerable pain or discomfort, lasting for several days after the operation. Following operations under local anaesthesia (the method of performing them is a secondary consideration, the most efficacious and simplest being, doubtless, the best) patients, on returning to bed, feel quite able to have something to eat or drink, and often enjoy a smoke; they are quite comfortable for from five to seven hours after the operation, when pain may occur, and last for several hours, though it never becomes intolerable. I suggest that this method, as endorsed by Sir William Wheeler and by Mr. Gabriel, is in all respects superior to any general or spinal anaesthesia.

Further, I think, that for the relief of post-operative pain, the systematic use of antipyrine should be given a fair trial; incorporated in vaseline it may be used immediately after the operation and for all subsequent dressings. It can be associated with any antiseptics that are not chemical incompatibles.—I am, etc.,

T. HENRY TREVES BARBER, M.D., B.Sc.

London, S.W.7, March 12th.

SIR,—I would like to endorse the opinions expressed by Dr. Barber (March 2nd, p. 397) on the advantages of local anaesthesia for the operative treatment of haemorrhoids and their complications. I have used local anaesthesia extensively for the past twelve years, especially for the ligature of haemorrhoids too fibrosed for effective treatment by sclerosing injections (the treatment of choice for simple or uncomplicated piles), and consider that it makes a combination of ligature and injection the ideal treatment when simple and complicated piles coexist. "Simple" haemorrhoids contain only varicose veins whose walls are not markedly fibrosed (about 50 per cent. of all pile cases), and "complicated" haemorrhoids may contain thick-walled veins, arteries, dense fibrous tissue, and another lesion—for example, fissure may coexist. A recent case will serve as illustration.

A male patient, aged 31, gave a history of prolapsed bleeding haemorrhoids of several years' duration. He had had to give up riding and sport. Examination showed five haemorrhoids, two small ones, three very large and fibrosed, two of the latter being intero-external. I injected the two small ones and removed the three larger by ligature under local anaesthesia. The patient had no pain or discomfort during the operation, and very little afterwards; he even refused a sedative that night, and was up on the second day, gentle exercise being allowed until healing was complete. Both the patient and his doctor have since warmly expressed their satisfaction at the result.

In sparing as much of the rectal mucous membrane as possible (by injection) and employing local anaesthesia for ligature, post-operative complications, such as stricture of the rectum, retention of urine, pain, and the period of lying up, are reduced to a minimum.

The anaesthetizing solutions I have chiefly used are a 1 per cent. quinine and urea hydrochloride, and a novocain solution somewhat similar to Dr. Barber's; each gives excellent results. Their advantages are that they are practically non-toxic and can thus be used in large dosage, they have a prolonged anaesthetic effect, and are haemostatic.

The technique I employ is simple and effective. It consists of deep infiltration to anaesthetize the sphincter and the tissues underlying the haemorrhoids. This is effected by means of four or five injections equi-spaced around the anus as follows. A 5 c.cm. syringe with a very fine needle 2 inches long is used. The skin at the point of injection is anaesthetized by injecting a few drops subcutaneously, and, by pushing the needle along under the skin, the points for further deep injections are anaesthetized so that only the initial needle-prick is felt. At a point on the skin half an inch from the anal opening, the needle is inserted downwards and slightly inwards through the sphincter to a depth of 1½ in., care being taken not to penetrate the bowel wall and inject anaesthetic into the rectum. A gloved finger in the bowel should obviate this by guiding the needle to its destination. Having reached the tissues underlying the haemorrhoid the solution is injected slowly drop by drop as the needle is gradually withdrawn. After three to five minutes anaesthesia will be complete. I have never found it necessary to apply the solution to the surface of the haemorrhoid nor to inject the anaesthetic into the body of the pile. Quinine and urea, whilst excellent for deep infiltration, should not be employed to anaesthetize the skin, as it causes thickening and induration of the cut edge. About 2 c.cm. of these solutions is necessary for each injection, but experience alone will teach the correct amount, which varies for different patients. Hirschmann has advocated local anaesthesia, both in writings and at British Medical Association and other medical meetings in this country, for over twenty years.

In my view Mitchell's operation should be abandoned in favour of the simple "ligature" advocated by proctologists in this country, which entails only a single cut with the scissors. Ano-rectal operations involving suture, of which Mitchell's is an example, should rarely be practised, as free drainage is essential in this region if sepsis is to be avoided. Stretching of the sphincter ani is seldom necessary; it frequently causes much pain, bruising, and damage to the sphincter with varying degrees of loss of control. Insertion of large rubber tubing after operation is unnecessary, and is a common cause of severe pain. Many times as a house-surgeon I answered the agonized appeal of some poor patient to take the tube out, and the relief from pain was always immediate. Haemorrhage after a skilfully performed ligature operation is uncommon.

The combined ligature and injection method causes the least pain, fewest complications, and shortest lying-up period. It is suitable for every type of case except where large sloughing haemorrhoids exist. Local anaesthesia is contraindicated in the latter condition.—I am, etc.,

London, W.C.1, March 7th. P. KENNEDY MURPHY, M.D.

A NEW METHOD OF APPROACH IN GASTRIC SURGERY.

SIR,—In reply to the letter of Dr. Roberts in your issue of March 9th (p. 474), I may say that the object of the experiment was to determine the effect of a single massive dose delivered directly to the growth. The purpose of my article was to state the effect observed and the result obtained.

I regret I did not enclose the technical details of the radiation. These I have now obtained from Dr. Cooper, and they are as follows:

Secondary current 3 ma.; secondary voltage 190 kv.; filter 0.5 mm. Cu+0.3 mm. Al; focus-skin distance 23 cm.; exposure 40 minutes. Dose 1.5 U.S.D.

—I am, etc.,

DIGBY CHAMBERLAIN, CH.M., F.R.C.S.

Leeds, March 12th

"EXANTHEMATIDES."

SIR,—In the abstract of my second Lettsomian Lecture, which you very kindly published in your issue of March 16th (p. 512), there are a few corrections I should like to make to avoid misunderstanding.

In paragraph 3 "undoubted syphilis" should read "untreated syphilis," and I did not say that in the period of freedom from symptoms the Wassermann was negative, but that it was less positive than in the active secondary stage, and might even become negative. In the last paragraph but one "continuous allergy" should read "cutaneous allergy." Lastly, my comparison between syphilis, tuberculosis, and rheumatic fever was quoted *in extenso* from a paper by Swift and his co-workers, to whom, of course, acknowledgement was made in my lecture.—I am, etc.,

London, W.1, March 15th. H. W. BARBER.

THE INTRACUTANEOUS TUBERCULIN TEST.

SIR,—Professor S. Lyle Cummins is hardly correct in stating (March 16th, p. 522) that, "so far as adults in this country are concerned, a positive tuberculin reaction has no diagnostic significance whatever." The Koch phenomenon, of which this test is but a modification, is, as Professor Cummins knows, long past the stage of scientific corroboration; and while it is true that its value in adults is limited, this is due, not to its lack of significance, but to its enormous significance—namely, wholesale infection. While no one familiar with the subject will initiate a long and expensive course of treatment by tuberculin on the strength of a positive intradermal test alone, there are other indications which may make it important to follow up the line of thought thus initiated.

The Medical Research Council has recently seen its way to recommend the intradermal tuberculin test for cattle (Special Report Series, 1925, 1928) as a reliable substitute for the more troublesome subcutaneous test as a means of differentiating sound and infected animals, and although one may not agree entirely with its conclusions, these are supported by a large volume of evidence.

The day is not far distant when greater value will be attached to the conception of a tubercle-free population than to that of tubercle-free cattle, and we are already becoming familiar with the word "detuberculization," which opens up an arresting vision.—I am, etc.,

Wandsworth, March 17th. ROBERT CARSWELL.

TUBERCULIN FOR ASTHMA IN CHILDREN.

SIR,—I was much interested by the paper on asthma in children by Drs. R. H. Simpson and Kenneth Stone, which appeared in the *Journal* of February 16th (p. 291).

What was more especially interesting to me was the fact that the authors use tuberculin in treatment with satisfactory results. As I have used tuberculin for some years in tuberculous asthma, perhaps I may be permitted to discuss the matter from the light of my own experience. I have dealt with the subject at some length in book form,[1] so I will only give a brief summary of the chief points bearing on the matter. I define tuberculous asthma as an "asthma occurring in a patient who reacts definitely to tuberculin or has *x*-ray or other evidence of tuberculosis, and in whom there is no discoverable cause beyond the tuberculous factor."

The following are the main characteristics of tuberculous asthmas:

1. They all react to tuberculin, but usually not very strongly.
2. The systolic blood pressure is a fairly good one, 120 to 140, not low, as one so often finds in tuberculosis.
3. The skiagraphic appearances of the lungs are normal in about 50 per cent. Of the remainder, only a small proportion show definite signs of activity.
4. The diurnal variations of temperature are usually very slight.
5. The season of the year has little influence.
6. With regard to food, they are not usually affected by meat, but they have a peculiar intolerance to fat and, to a lesser extent, to carbohydrates.
7. As to the age of onset, I have known it commence at the age of 4, but in other cases not till after 50.
8. A definite family history of asthma is rare, but a family history of tuberculosis is common.
9. The patients are often in poor health. They seem to be suffering from a mild form of toxaemia. This is in contrast with what one finds in many other forms of asthma.

H. Grossfeld of Vienna[1] considers that genuine cases of bronchial asthma are tuberculous. He also states that, in animals infected with human tuberculosis, asthma may be induced by injecting tuberculin. He thinks that asthma is a protective defence against tuberculous invasion.

While agreeing that the majority of cases of asthma are probably tuberculous, they are not *all* so affected, for, if they were, we should get a much higher proportion of cases reacting to tuberculin than we do. It is certainly a fact that an overdose of tuberculin in a tuberculous asthmatic will produce an attack of asthma. I also agree that in a sense tuberculous asthma may act as a defence against tuberculosis of the lungs. At any rate, it is comparatively rare to see asthma in an advanced stage of phthisis. But this is somewhat of a digression.

Having made a diagnosis on the aforementioned data, I commence treatment with 0.1 c.cm. of tuberculin liniment and double it each week till 1 c.cm. is given. When fairly big doses have been administered in this manner, a tuberculin rash very commonly appears on the arm or any other site where the liniment has been applied, and this is usually accompanied by an amelioration of the asthma. Should this not be the case, I proceed to injections, commencing with T.A.F. 0.0001 c.cm. and cautiously increase week by week. If these doses cause reactions or an attack of asthma, it is generally wisest to return to the liniment and continue with this till the patient is effectively desensitized.

I agree with Drs. Simpson and Stone that there is an "optimum" dose for each case, and it is unnecessary to increase beyond this dose. Having found the optimum dose, which is sometimes big, sometimes surprisingly small, I inject with it once a fortnight or at even less frequent intervals, and eventually discontinue altogether.

I have not found tuberculin of service in non-tuberculous asthmas. I treat these with peptone or autogenous vaccines and get a fair amount of success, especially if a focal infection has been found and dealt with. The success is, however, not to be compared with that which I have had with true tuberculous asthmas treated with tuberculin. Practically every case of tuberculous asthma is ameliorated if not cured. The general health improves, then the attacks of asthma get less severe, and eventually, in most cases, cease altogether.

The difference of opinion between myself and Drs. Simpson and Stone as to the specificity of tuberculin may be due to a difference in technique. As I have said, patients with tuberculous asthma are not, as a rule, very sensitive to tuberculin. The authors use the von Pirquet method; I use the modification of this practised by H. A. Ellis. The point about Ellis's method is that an incision is made through the von Pirquet droplet so as to draw blood. The test is, consequently, more delicate than the ordinary one, a point of considerable importance in diagnosing insensitive asthmas. Another point is that in treatment they use "old tuberculin," which contains albumose, whereas I use "tuberculin albumose free," in which the albumose has been removed, so far as possible, from the preparation. Is it not conceivable that the good results they are getting are due to the albumose? These are, however, minor points. The great thing is that they and some others are gradually realizing the value of tuberculin, which, even at the present time, to most of our profession, spells anathema.—I am, etc.,

London, E.C., Feb. 21st. F. E. GUNTER.

IMMEDIATE ENUCLEATION FOR QUINSY.

SIR,—As Mr. Vlasto would appear to be sceptical of the good result I obtained in the case quoted on February 23rd (p. 374), would you be good enough to allow me to reply to his queries under three headings?

1. Trismus, which is usually most noticeable in the region of the anterior pillar and due to the action of the superior

[1] *Tuberculin in Practice: Its Value in the Diagnosis and Treatment of Early Tuberculosis and Asthma.* Gregg Publishing Company. 1928.

[1] H. Grossfeld. Quoted in *Epitome* of the *British Medical Journal*, November 13th, 1926, para. 468.

constrictor muscle, is overcome not by a sedative, but by the action of the local anaesthetic. The sedative given is two cubes of sedobrol in a warm drink an hour or so before operation. The local anaesthesia is produced as follows. There is no preliminary swabbing of fauces or palate. Three drachms of 0.1 per cent. cocaine solution (1 grain to the ounce), to which 3 minims of 1/1000 adrenaline chloride solution have been added, are injected by a Matthew's syringe with curved needle—a drachm at a time, (*a*) just behind the anterior pillar, (*b*) just in front of the posterior pillar, and (*c*) behind the upper pole of the visible tonsil. There is a noticeable blanching and distension of the mucous membrane, but the injection is not resented by the patient.

2. The operation is proceeded with almost immediately. A short-bladed long-handled knife (Robertson pattern or Bard-Parker, blade No. 15, handle No. 5) is introduced at the base of the anterior pillar, and carried firmly upwards to the upper pole, following accurately the margin of the pillar, which is always clearly defined; the upper pole is encircled, and the knife carried downwards between the posterior pillar and the tonsil till it meets a tongue depressor provided with a flange, by which the left hand holds the tongue downwards and inwards. The tonsil is next drawn inwards and forwards by a Richards vulsellum, and the rest of the dissection of the tonsil completed by a long and curved pair of Mayo scissors in the manner described by Mr. Wallace. In a quinsy the tonsil is more friable than usual, the capsule having almost certainly been perforated in the course of the condition, and may consequently not be completely removed by the Tidding snare; this can be put right on a second inspection. The pus and blood are now carefully swabbed away by gentle pressure in the tonsillar bed. The patient already feels much relieved, and the pillars are relaxed. A pillar-retractor lays the tonsillar bed fully open to inspection, and the mouth is at once rinsed out with a suitable mouth-wash. No serious haemorrhage has so far been experienced.

3. The after-treatment is relatively simple. Frequent mouth-washes are employed for three or four days, or as long as may be deemed necessary. On the same evening the 0.1 per cent. cocaine solution may be safely sprayed on the fauces, or applied to the tonsil bed on a gauze pledget, and aspirin (10 grains) is sufficient to secure a fair night's rest.

Mr. Vlasto will probably agree that the usually accepted treatment of quinsies leaves much to be desired. Cases frequently reach hospital after one or more attempts at incision have been made and have failed. After healing has taken place the tonsil is rarely removed, and the patient is liable to recurrences. Removal of the tonsil removes the cause, just as extraction of a decayed tooth is usually all that is required in the treatment of a dental abscess.

Finally, two important criticisms have been, and will be, levied against this method. First, with regard to the use of cocaine: the very weak solution here employed is sufficient to produce analgesia, if not always complete anaesthesia, and at the same time a marked reduction of haemorrhage and a minimal risk of cocainism. Secondly, it may be considered unsurgical to produce a large raw surface in the presence of suppuration, but experience will show whether such a risk is not far out-balanced by the improvement in drainage, the earlier recovery of function, and the free access of antiseptics to the tonsil bed itself. I feel confident that those who employ this method in quinsies will be agreeably surprised, but they should practise the technique on simple cases first.—I am, etc.,

Oxford, March 11th. HUGH WHITELOCKE.

SIR,—Mr. Michael Vlasto (March 9th, p. 477) appears to have been using the razor edge of a fine technique for a surgical operation, which, comparatively speaking, needs a billhook and hoe.

The trismus yields even in the worst cases to the powerful leverage of the Sydenham gag, while the capsule is represented by the shaggy wall of the abscess cavity on its tonsillar aspect. Sometimes one undoubtedly removes quite an appreciable part of the anterior pillar and other tissues—for example, the ossified stylopharyngeus muscle and styloid process, broken off from the temporal bone, as in one case I reported (February 16th, p. 296), but the patients are all the better for the removal of such coccus-soaked fibrous scars.

The ultimate technique which will survive for use by the practitioner of the future must be one which is quick, easy, safe, and within the capacity of even a moderately clumsy operator, and whose complications permit the application of quick, easy, and safe remedies or preventive steps. The dangers I keep in mind, but have not yet met in 120 cases or more, are as follows:

1. Bleeding.—Immediate, reactionary, and secondary haemorrhage can be readily controlled by sharply jerking off with a Collins pile forceps every tag in the empty bed of the tonsil. The forceps are inserted open, with one oval fenestrated end pointing upwards under the supratonsillar fossa and the other as far as possible below the site recently occupied by the inferior pole, and are then closed, with the ends lightly pressing against the empty bed. Haemoplastic deficiency leading to continuous oozing can be treated by injecting, locally, fresh or "proprietary" serum. I have not tried this for quinsy cases, the first method having always proved adequate, but have used it for "bleeders" accidentally operated upon in routine clinic work by the blunt-bladed guillotine method. In these cases I have injected the palate and pillars, and also the retropharyngeal tissues, because oozing came from the post-nasal region as well.

2. Inhalation of clots or pus.—This can only be guarded against by placing the patient in a proper position. Induce anaesthesia with the head well raised on several pillows, and, when fully under, then the head must be absolutely over the end of the table and upside down, and the shoulders raised by a folded towel. Meanwhile the assistant or anaesthetist must be drilled to keep a good airway, by holding the tongue out with the clip and, most important of all, the mandible well forward. This prevents the laborious inhalations which might suck in such clots or pus; these can then fall into the roof of the mouth, whence by a flick of the fingers they may be swept out over the upper incisor teeth.

3. Dislodgement of septic clots into veins resulting in pyaemia.—This danger must be guarded against by avoiding pressure on the quinsy until the long Mayo scissors have opened the abscess. When, as in 20 per cent. of the cases, the condition is a pure streptococcal cellulitis with jelly-like oedema, the scissors can open widely behind the tonsil and scar tissue, and the finger follow to detach the upper pole and posterior pillar.

In one emergency case I enucleated both tonsils for quinsy with only a long artery forceps, a pair of domestic scissors, a safety-pin for a tongue clip, and two cotton reels for a gag. If anyone would care for a demonstration I should be pleased to arrange it, here or elsewhere.—I am, etc.,

Bishop's Stortford, March 11th. R. A. R. WALLACE.

THE CAUSE AND CURE OF MORNING SICKNESS.

SIR,—In his letter published on March 9th (p. 479) Dr. Reid inquires with regard to the recognized propensity of glycerin to cause abortion. I have never had such a case in my practice, and this extending over many years. I have had this same inquiry made by the matron of a nursing home in Glasgow, where the subject has aroused a good deal of criticism.

It is only fair to say that I am cognizant of two cases of abortion which have occurred in the practice of others. The first was one of a lady in Nottinghamshire on whom I had operated for a badly torn cervix with a good deal of prolapsus uteri. My treatment stopped the vomiting, but some time afterwards she aborted with a twin pregnancy. The other case was one which occurred in my son's practice. The treatment was given during July, 1928, and during August she was overworked in nursing two of her relatives. She aborted in September, 1928. My conviction is that in neither case was the glycerin responsible.—I am, etc.,

Paisley, March 9th. ANDREW RICHMOND, M.B., C.M.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

THE House of Lords having returned the Local Government Bill with amendments, the Prime Minister announced that the House of Commons would consider these amendments on Friday, March 22nd. Among them was Lord Onslow's amendment providing for consultation between the new public health authorities and representatives of the local voluntary hospitals regarding the preparation of schemes for provision of hospitals and other institutional accommodation. The Minister of Health is understood to have ready, for dispatch to counties and county borough councils soon after the bill passes, a model administrative scheme under Clause 4 of the bill.

The Local Government (Scotland) Bill has passed second reading in the House of Lords.

This week the House of Commons further considered the Navy Estimates and debated general questions on the Consolidated Fund Bill.

The Local Government Bill.

Report Stage in the House of Lords.

On March 14th the House of Lords considered the Local Government Bill on report. Lord ONSLOW, who was in charge of the bill for the Government, moved a drafting amendment to Clause 2. He explained that this clause handed over to maternity and child welfare authorities functions under Part I of the Children Act, 1908, and converted functions relating to vaccination into public health functions. It was convenient that these two sets of functions should not be dealt with as transferred functions under Clause 4 of the bill. Similarly, the provisions of Part I of the bill, relating to acquisition of land and to accounts and audit, should not apply to them.

The House agreed with an amendment designed to make the changes Lord Onslow thought necessary.

Administrative Arrangements for Discharge of Functions Transferred to Councils.

Clause 4 enjoins the council of every county and county borough to prepare and submit to the Minister a scheme of the administrative arrangements to be made for discharging the functions transferred to the council under Part I of the Act. Lord COZENS-HARDY moved to add after the word "Act" "and any similar functions under any of the Acts set out in Clause 5." He said the explanatory memorandum accompanying the bill pointed out that the Poor Law administration would be transferred to authorities already providing hospitals "which overlap similar provision made by boards of guardians for persons who are destitute." The memorandum went on to say that, "The organization of the institutional service can only be undertaken by a body viewing the needs of the county as a whole." Lord Cozens-Hardy said a Minister could not judge whether a council had envisaged the whole problem when that Minister had only to deal with the discharge of the transferred Poor Law functions. The bill did not require the scheme to survey the whole area so as to set up administrative machinery which would secure the best use and development of existing institutions. Rationalization of the hospital services might call for the transfer of some functions from the Health Committee to the Public Assistance Committee, but the bill did not provide for that. Without freedom to redistribute functions between the old and new committees a council might find itself hampered in preparing a scheme which would dovetail Poor Law and public health functions into one whole. He had also put down to later clauses amendments designed to secure this, and he would like to make the same insertion into the new clause which Lord Onslow had put down concerning consultation with voluntary hospitals. The new clause meant that voluntary hospitals and the medical profession need only be consulted on a limited portion of the field. The new clause would leave the council free to provide extra hospital accommodation without any consultation if the proposed new institution was not required for Poor Law functions. If overlapping were to be prevented it was essential that the consultation should cover all hospitals, whether provided in discharge of the transferred functions or of similar functions under the Public Health Acts.

Lord ONSLOW said there was no need for the words which Lord Cozens-Hardy sought to add to the clause. Arrangements under the special Acts did not need to be included in the scheme. Where a declaration was made of intention to deal with the destitute under one or other of the special Acts (Public Health Act, Mental Deficiency Act, Maternity and Child Welfare Act, etc.) the result would only be to bring additional persons within a scheme which had in nearly every case been approved by the Minister of Health.

Lord Cozens-Hardy's amendment was negatived.

Consultation with Representatives of Voluntary Hospitals.

The new Clause 13, proposed by the Government while the bill was before the Lords in committee, and then inserted, ran:

"*Consultation by councils of counties and county boroughs with bodies representing voluntary hospitals.*—The council of every county and county borough shall make such arrangements as they think desirable for securing that the functions transferred to them under this part of this Act with respect to the provision of hospital accommodation will be discharged after consultation with such body, if any, within the county or county borough as they consider to represent the voluntary hospitals in the area."

Lord ONSLOW had an amendment to this on the paper.

Lord HANWORTH moved a revised form of the clause, which sought to provide that the persons consulted should include bodies or persons representing the voluntary hospitals of the area and representatives of the medical and surgical staffs of any voluntary hospitals in the area, and that the subjects of consultation should include hospital treatment as well as hospital accommodation. He said he had no right to speak for the hospitals, but intervened as a draftsman. Some very loose terms had been used when the subject of hospital accommodation was discussed in committee. His form of clause proposed to make the consultation compulsory, and to give the council freedom to consult those carrying on work in cottage hospitals who might not have an organization or a share in any committee. He thought the use of the word "accommodation" in the Government clause narrowed the consultation too much. He was sure that the peers had not intended to refer merely to the provision of beds, and he therefore put in the words "and treatment."

As a preliminary to discussion the House discarded Clause 13 in its original form. Lord READING then remarked that the discussion in committee had shown a consensus that specific provision should be made in the bill to ensure consultation with the voluntary hospitals. The Government proposed consultation, but the council would not be bound by anything which was urged by the voluntary hospitals. He approved that. He agreed with Lord Hanworth that it was desirable to specify treatment as well as accommodation. Lord Reading objected to the Government clause leaving to a council the power of determining what body, in its opinion, represented the voluntary hospitals. There might be a dispute in some county on whether a body of persons really represented the voluntary hospitals. Such a dispute ought not to be brought before a court of law, but referred to the Minister, whose decision should be final.

Lord KNUTSFORD urged the House to accept the word "treatment." For the benefit of the people at large he wanted the county councils, in drawing up and carrying out their schemes for new hospitals, to have the experience not only of laymen who had managed hospitals, but of the medical and surgical staff, who represented the highest advance and highest knowledge in the profession. At present the country had two diverse bodies—the voluntary hospital, with a magnificent staff, and the Poor Law infirmary, with perhaps one able man and no staff of importance to help him. No improvement could be carried out unless there was co-ordination and co-operation in working. He hoped that with such recurrent consultation with those at the head of the profession they would no longer see, as they now did in some of the Poor Law infirmaries, one man, however able, doing every sort of operation, as he would never dare do on the staff of a voluntary hospital. He hoped they would not continue to see anaesthetists employed who were nothing like so good as those available in the profession. He hoped they would never see what he saw last year—a young man, not even on the staff of a great hospital, going to take over the locum at one of the biggest Poor Law hospitals, first on the medical and then on the surgical side. That young man had said to Lord Knutsford, "Look at the experience for me." But what about the patients?

Lord BLEDISLOE feared that cottage hospitals might not be represented by the bodies or committees selected as representative of voluntary hospitals. The small village hospitals also served as clinics for examination and treatment, under the Education Act of 1921, of children suffering from small maladies of the throat, ear, or eye, and so justified themselves for county work.

Lord ONSLOW had on the paper the following proposed new clause in substitution for the Clause 13 which the House had just discarded:

"*Consultation as to the provision of hospital accommodation.*—The council of every county and county borough shall, before making provision for hospital accommodation in discharge of the functions transferred to them under this part of the Act, consult with such committee or other body, if any, as they consider to represent both the governing bodies and the medical and surgical staffs of the voluntary hospitals providing services in or for the benefit of the county or county borough."

Lord Dawson's Amendments.

Lord DAWSON OF PENN had handed in two amendments to Lord Hanworth's proposed clause. These provided that the council should also consult "with representatives of the medical faculty of any university which serves the area." He said he wished to point out the crucial differences between Lord Hanworth's clause

and that which Lord Onslow had placed on the paper. The House had agreed in committee that the new public health bodies were, at the moment they entered the field of curative medicine, going to undertake a large responsibility. Neither the councils nor the medical men advising them would have previous knowledge or experience adequate to carry on these new duties, and the sense of the House of Lords in committee had been that some help should be given, not by compulsion, but through conference with the voluntary hospitals and the staffs attached to them, and with that part of the medical profession which had always dealt with curative medicine. He had understood the committee to agree that this consultation should be real, effective, and recurring. The Government clause said there should be this consultation on hospital accommodation. In plain English "accommodation" meant nothing more than the mere fabric and arrangements of the buildings. That was a futile concession. If, on the other hand, the words "and treatment" were included, that did not mean that medical men and representatives of hospital managers were to come in every time to interfere with the proper management of these new hospitals. It meant that real conference should take place to determine not only the buildings to be put up, but the purposes for which they were to be used. He was not wedded to the words "and treatment," but he was to the principle that the people who had acquired experience through generations should bring it to the aid of these inexperienced councils and their medical men. The work of a general hospital had grown up through generations, and there was among members of the staff a tradition, a habit, an atmosphere of restraining opinion, which secured that, while every man got his chance, the right man was put on the right job. If a young and talented man showed a tendency to allow his enterprise to outstrip his judgement, Lord Knutsford, for instance, might step in with a word of restraint. The result was that wrong things were not done and the right men got the right jobs. The system had grown up little by little, with all the talent of the medical profession behind it. All men of talent moved in the direction of hospital work. Did the House wish to alienate the profession? How could they work the hospitals without it? He sometimes imagined that the Government wished to do it, because they brought in the bill without consulting the heads of the profession. Suppose an enterprising council said, with good intentions, that it would take up radium. All the medical profession asked, before these inexperienced councils took up a weapon so useful for the public good, so powerful in the right hands, so dangerous in the wrong, was that they should confer with persons of experience whether this treatment was to be used, and whether, when the treatment was complicated, it should be done in other places. An inexperienced hospital would require years to get the right staff, and could not get it unless the confidence of the profession was won. Until these new places had earned academic standing they would not draw the best men from the universities. About the founding of these new hospitals there had been no proper conference with the medical profession, however informal and unofficial. Surely it would have been natural to have called the heads of the profession together and to have said, "We think of giving powers of general treatment to these new county hospitals. Can you give us advice and draw up a scheme? We do not commit ourselves to accepting it." Because there had been no proper consultation of that sort he was sceptical when he found Lord Onslow's clause gave nothing but a barren concession on hospital accommodation, and contained no words which said the medical profession should be consulted on the purposes for which that accommodation was to be used.

Lord ONSLOW then offered an explanation of his alternative clause (set out above the commencement of Lord Dawson's speech). He said this was prepared to give effect to the desire Lord Dawson had expressed in committee, that there should be consultation with "any body existing in the area which is so constituted as to be representative of the duly qualified medical practitioners and of the medical and surgical staffs of the voluntary hospitals in the area." Lord Onslow remarked that Lord Dawson had not put those words on the paper, and that Lord Hanworth had thought they should be drawn tighter and made more explanatory. The Government had done something to meet that view. Turning to Lord Hanworth's amendment (summarized above), Lord Onslow said the Government could not agree to consultation with "persons" as well as with "bodies." That would enable a local authority to consult with individuals but refuse to consult with the Voluntary Hospitals Association or with the British Hospitals Association. It would enable a county council to "give the go-by" to hospital representatives. The Government thought the body to be consulted should represent the voluntary hospitals in the area, including the medical staffs. Till recently there existed, in practically every county and in many county boroughs, local voluntary hospital committees, formed by the Voluntary Hospitals Association. A number still existed, and were active. In Manchester and Sheffield good work was being carried on by these bodies. Some had become hospital councils, and some, especially in the county areas, existed on paper. Again, the Hospitals Association had a network of committees over the country. They were reorganizing these already to make more serviceable bodies, which would be at the disposal of the local authorities for the purposes mentioned in the bill.

Lord KNUTSFORD interposed to say there were no medical men on the Hospitals Association.

Lord ONSLOW replied that though there were none on the Hospitals Association there were on the voluntary hospitals committees. On these, medical men were represented both by consultants and by general practitioners connected with the hospitals. There might be areas where no committee was available at present, and in these it was desirable that one should be set up. As a result of the bill voluntary hospitals in each area should combine for the purpose of consulting with the local authority. Lord Knutsford assured him that the cottage hospitals, for which Lord Bledisloe had expressed concern, were represented on the Hospitals Association, and he had no doubt that they would have the opportunity of giving their advice. As the local authority was the body responsible for managing its institutions, it should judge who really represented the voluntary hospitals, and with whom it should establish relations. Lord Hanworth had suggested that where two bodies claimed to represent the voluntary hospitals of the district the Minister should judge. To carry out that suggestion would be difficult. There might be a voluntary hospitals committee functioning in an area and doing good work. On the other hand, the Hospitals Association might say, "Surely it is more convenient and better to have one organization between the country." That had already been urged. For the Minister to decide, meticulous local inquiry would be needed. Lord Onslow thought the House could trust the local authority not to use the bad committee rather than the good one. He was willing to meet Lord Hanworth's objections to the phrase "if any" in the Government's new clause. Turning to the proposal that consultation should be about "treatment" as well as about "accommodation," Lord Onslow remarked that if Lord Hanworth thought "accommodation" too narrow he himself thought "treatment" too vague. He was advised that if "treatment" were included a local authority would be under an obligation to consult the committee not only on the internal management of the hospital, but on the medical treatment of the patients. Lord Dawson had said that would be unacceptable. In these circumstances the Government could not accept the amendment proposed by Lord Hanworth.

Lord DAWSON asked whether Lord Onslow would accept the words "hospital accommodation and the functions to which that accommodation should be assigned." He meant no interference of any kind.

Lord ONSLOW said he thought the Government could accept the proposal in that form.

Lord DAWSON said he would like to consult Lord Reading and Lord Hanworth. If told the words he had just suggested were sound drafting he would accept them.

Lord ONSLOW said he and Lord Dawson were getting close together.

Lord HANWORTH said he must adhere to the words "and treatment."

Lord ONSLOW said he was advised by the Government draftsman that "and treatment" would include dealing with the individual patients. Equal facilities would doubtless be suggested for, or claimed by, the medical advisers of the local authorities. These would say, "You are consulted in regard to the treatment of patients in the local authorities' hospitals. We desire that our medical advisers should be consulted in regard to the management or treatment of patients in the voluntary hospitals." That would not be desirable, and Lord Onslow said he was willing to accept Lord Dawson's new suggestion, which would meet the case. This new experimental system was interesting and important, and ought to be initiated with the good will of all local authorities. He had reason to suppose that this good will would be forthcoming, and that the arrangement would develop into a useful method of consultation between two great authorities dealing with the same subject.

Lord BEAUCHAMP pointed out that in the Local Government (Scotland) Bill "hospital facilities" included "arrangements with respect to the provision of treatment." English hospitals should be treated as well as Scottish hospitals, and the Lords should insist on including the word "treatment" in the English bill.

Lord COZENS-HARDY pointed out that Lord Onslow's amendment referred to "voluntary hospitals providing services in or for the benefit of the county or county borough." That met the case of the hospital serving an area though not within it.

Lord ATKIN said he could not imagine anything more objectionable than that the medical men in charge of a hospital should have to consult some outside body to determine what treatment they should render at a particular time to a particular patient. It did not seem to him that the words suggested by Lord Hanworth could bear that meaning. Treatment could only be in respect of general provisions.

The LORD CHANCELLOR said that if the bill provided that the council must consult with a body which represented the voluntary hospitals, then, when the council proposed to spend money on a scheme, it would be open to anyone to move for a writ of pro-

hibition on the ground that they had not carried out the obligation imposed on them under the clause. If they had consulted with some body which, in the opinion of the court, was not a representative body, then they would not have carried out their duty. There would be more chance of advice being accepted if the persons whom the county council consulted were not forced upon them against their will. The wisest plan would be to let the county council consult those whom it regarded as representative of the voluntary hospitals in the area. Turning to the interpretation of "treatment," the Lord Chancellor remarked that Lord Dawson and Lord Onslow agreed that consultation should extend to the function for which the particular hospital was to be used. If that were so, the Peers would be wise not to insist on putting in words which the Government believed would have an undesired effect. He suggested that the House should accept the clause proposed by Lord Onslow on the understanding that before third reading the Government, in discussion with Lord Dawson, would endeavour to find words providing for consultation on the function for which the accommodation was to be assigned, but not open to the risk of bringing interference with detailed treatment.

The House then divided, and negatived Lord Hanworth's proposed clause by 52 to 42.

Lord ONSLOW then moved his new clause as set out above.

Lord DAWSON moved to amend the clause by adding provisos for consultation also with "the medical faculty of any university which serves the area" and with "the duly qualified medical practitioners in the area." He said the custom had arisen in late years of linking up medical services in voluntary hospitals with the medical faculties of the nearest universities. Representatives of the faculty of medicine who were concerned with laboratory investigations and forms of research should be able to join in any representations made in conferences with the local council. Liverpool University, for instance, by means of its medical faculty, spread its influence over seven or eight counties. Hospitals in all that area turned to it for advice and made use of its laboratories and teachers. Representation of the medical faculty of a university need not be confined to one county. Cambridge, Birmingham, Liverpool, and Manchester served large areas. His second proposal, for representation of the duly qualified medical practitioners in the area, he had raised in the debate on the committee stage. The House should bear in mind that the doctors who up to now had given their advice, which was excellent, because they were admirable in their own domain of preventive medicine, were much fewer than the 28,000 doctors engaged in curative medicine in England and Wales. When curative functions were going to be added to the county councils there should be some representation of the men who spent their lives dealing with disease.

Lord ONSLOW said the Government could not accept Lord Dawson's amendment. The point about representation of the medical faculties of universities was already met by the Government provision for consultation with representatives of the medical and surgical staffs of voluntary hospitals. If the university medical men did not usually attend the hospitals, then those medical men who were attached to the hospitals should be consulted by the councils. Those whose advice the Government desired were those who were intimately connected with the voluntary hospitals administratively, financially, or in a professional capacity.

Lord DAWSON intervened to remark that pathologists, bacteriologists, and those who did chemical and radiological work were not necessarily on the staffs of voluntary hospitals nor connected with the wards and the actual treatment of patients.

Lord ONSLOW said these men were connected with the hospitals in other ways, and their case might be met by the clause. Turning to the second part of Lord Dawson's amendment, Lord Onslow contended that to bring in medical men who were not connected with the hospitals but practised in the area would lead to confusion. It was undesirable that those who were unconnected with the hospitals should be brought in to manage them. Medical men connected with the hospitals would be amply able to supply the advice which the councils would seek.

Lord Dawson's amendment to Lord Onslow's proposed new clause was then negatived without a division, and Lord Onslow's clause was agreed to, after the words "if any" had been deleted on the motion of Lord Reading.

Recovery of Expenses for Maintenance.

Clause 16 (previously numbered as Clause 15), dealing with recovery of expenses from patients in council hospitals, does not allow expenses to be claimed from patients suffering from infectious disease.

Lord ARNOLD moved an amendment to ascertain whether surgical tuberculosis was covered by the words "infectious disease." He also contended that every encouragement should be given to persons suffering from cancer to seek treatment, and proposed that the Minister should have power to exempt from charges sufferers from such diseases as he thought fit.

Lord ONSLOW said the point had been considered, but the Government could not meet Lord Arnold's wishes. An infectious disease was one from which it was desirable to safeguard other persons. Cancer was not considered an infectious disease, and could not be included. Some forms of surgical tuberculosis were not included. The proper course was to lay down a criterion which would safeguard other persons, leaving the local authority to decide what was an infectious disease and what was not. That could not be closely laid down in the bill because, as Lord Dawson had pointed out, knowledge was changing from month to month. Diseases later found to be infectious would automatically come under the scope of the bill.

Lord Arnold's amendment was negatived.

Supervision of Midwives.

Clause 60 deals with the supervision of midwives, and enacts that any district council which has established a maternity and child welfare committee, and which employs a whole-time medical officer, may apply to be the local supervising authority under the Midwives Acts.

Lord HUNSDON moved to confine this privilege to councils which were also local education authorities. His object was to reduce the number of small districts which could apply for the inspection of midwives. He remarked that he was glad the Government, in response to representations in committee, had agreed to provide a local inquiry into these applications by district councils.

Lord ONSLOW said there were 139 district councils covered by the clause, and of them all but 32 were education authorities. Only six or seven large authorities did not happen to be education authorities.

Lord HUNSDON withdrew his amendment, and the House, on the motion of Lord ONSLOW, inserted amendments providing that the supervision of midwives should only be delegated by the Minister after consultation with the county council, and that if requested by the county council the Minister shall hold a local inquiry before making an order.

In Clause 129 (definitions) the following was added:

Page 111, line 10, at end insert ("'Public health services' includes services relating to maternity and child welfare, lunacy and mental deficiency, and the welfare of the blind").

The word "sanatoria" as used in the bill was supplemented by "or other institutions for the treatment of tuberculosis."

The report stage then concluded.

Local Government (Scotland) Bill.

On March 5th the Local Government (Scotland) Bill was considered on report, having previously been amended in committee of the House of Commons.

A new clause was moved on behalf of the Labour party by Mr. Johnston, the purpose of which was to empower the Secretary of State to raise to the status of a large borough, independent of the county, any borough which during the summer months habitually had a large excess of population.

Dr. ELLIOT said that Mr. Johnston had not made out a case; any argument had really been met when the Secretary for Scotland decided to leave the services of water, of drainage, and of sanitation within the purview of all boroughs. It was not considered that a fluctuating population required special provision to be made for poor relief, for lunacy, and mental deficiency. Dr. Elliot said that in small boroughs certain things were done counter to the interests of economy and efficiency. The northern district of Ayrshire had six small boroughs with six infectious disease hospitals averaging fourteen beds each. The object of efficient service would be better secured by a combination which would enable full use to be made of each of these institutions. Three or four years ago a part of the Springvale Hospital belonging to Ardrossan and Saltcoats was destroyed by fire; this was an opportunity for combination with Irvine, but the two boroughs preferred to re-establish the building which had been destroyed. The Government's proposal to make 20,000 population the lower limit for autonomous boroughs was not a temporary adjustment, but an attempt to make a strong financial unit which could put to fullest use existing institutional accommodation and plan its policy over a period of years.

Mr. JOHNSTON protested that the overwhelming majority of the boroughs in Scotland had, when profitable, combined to run joint infectious disease hospitals.

Dr. DRUMMOND SHIELS recalled that in a previous discussion on the same subject the Government had agreed to allow a medical officer to be retained in boroughs whose population was greatly increased during the holiday season. He remarked that boroughs like Oban and St. Andrews had supplied not only their own health services, but the health services for the county and hospital accommodation as well. He thought there was a case for such boroughs retaining their medical officer of health and their control over major health functions.

The clause was rejected by 205 to 115.

On Clause 2, dealing with the transfer of functions of town councils to county councils, Dr. ELLIOT said that the merging of local and county administrations would provide a more efficient service throughout Scotland. Committee after committee had urgently reported that wider areas of health services would be

for the good of Scotland as a whole. With regard to the Highlands and Islands, an authoritative committee, presided over by the Duchess of Atholl, and including Dr. Donald Murray, former member for the Western Isles, had recommended that for the major health services the area of administration in the Highlands and Islands should be the county. The clause was added to the bill by 181 to 93.

Consideration of the bill on report was resumed on March 6th, when Mr. JAMES STUART moved an amendment to delete some of the proposals of Clause 10, dealing with the uniting of boroughs and combining of councils for certain purposes. He suggested that in the case of the counties of Moray and Nairn it was not necessary to amalgamate public health services, because these had been adequately maintained in the past; both the county and the borough of Nairn were served by a voluntary hospital and district nursing services which were not a burden on the rates. In connexion with maternity and child welfare, there was an arrangement with local doctors to attend when children were ill. Although there was no formal scheme for tuberculous cases, adequate provision was made in this respect.

Sir JOHN GILMOUR said the county of Nairn, including the borough, had only a population of 8,790, and the county of Kinross one of 7,963. The Scottish Office desired to combine these two very small counties with their neighbours. Under the national health insurance scheme Nairn and Moray had been combined. Nairn had no county scheme for the treatment of tuberculosis, and none for maternity and child welfare service. Health services which were essentially necessary did not at present exist there. The medical officer of health and the school medical officer were obtained by combination with Moray. There were a considerable number of cases of tuberculosis in the county and borough of Nairn, and no institution existed for the treatment of early or advanced cases. The provision for school health administration was incomplete in Nairn, especially as regards dental treatment and treatment of the ear, nose, and throat. The Government's proposals for combination were accepted by the House by 157 votes to 106.

On Clause 33, which empowers the medical officer of health and sanitary inspector to act for small boroughs, Dr. ELLIOT moved to insert a provision that:

Except with the sanction of the Department of Health no person shall, after the commencement of this Act, be appointed sanitary inspector of a county or borough unless he possesses such qualifications as may be prescribed by the Department of Health.

He said the Government required to reserve the right to take further steps to raise the status of sanitary inspectors. The House agreed to the amendment.

Dr. ELLIOT moved a new clause dealing with the power of councils to expend money on public health propaganda. It ran:

It shall be lawful for any county council or for the town council of a large borough to incur expenditure in making contributions to the central council or committee of an organization approved by the Department of Health, which provides services of the nature of publicity or educational propaganda for any purpose relating to public health, or in the provision by themselves of such services.

Dr. Elliot said the clause was put down in consequence of a discussion in committee about the power of local authorities to spend money on propaganda against venereal disease. He had then agreed to go into the matter again on the understanding that any proposals would not deal solely with that disease, but that general powers would be given for propaganda in respect of health education concerning any kind of disease. This new clause met that undertaking, and he understood it was particularly desired by the city of Edinburgh.

Dr. DRUMMOND SHIELS was glad of the new clause as far as it went. He would have preferred some national effort, either by the Department of Health or by some central organization, whereby national propaganda would have been effectively carried out. It was not certain that dependence on the efforts of local authorities in this matter would be satisfactory. It was right that propaganda should not be confined to any disease. For example, if public health propaganda on the importance of the early treatment of cancer were carried out many lives would be saved. The concession established the principle that health propaganda was the duty of public authorities.

The clause was added to the bill, as was also another clause moved by Dr. Elliot to sweep away the disqualification whereby sick persons in Poor Law institutions were only allowed to receive pensions up to a period of three months' residence.

The report stage then closed and the bill was set down for third reading on March 11th.

Third Reading Debate.

On March 11th Sir JOHN GILMOUR moved the third reading of the Local Government (Scotland) Bill. He said that with the best intentions many of the existing local authorities had been incapable of meeting adequately the problems connected with housing and public health matters. Unless there was a co-ordination of effort there would be wastage and inefficiency. In Glasgow, for example, he did not see that co-ordination and co-operation between either the private hospitals or the private hospitals and the public hospitals which was essential if there was to be real efficiency. The provisions of the bill held out, not only the hope, but, in his judgement, the certainty of a great solution of this problem. They had behind them the whole-hearted co-operation of the managers of the great hospitals and of the members of the medical profession, who were closely linked with them. In the development of these services he visualized more and more paying wards within the hospitals and the building of annexes in the fresher and purer air of the countryside, to which would be taken at various stages those who first entered the hospitals in the great cities. It was only by complete co-ordination between the work in the city and the local authorities in the counties outside that they would get a proper solution of this problem. If the bill had dealt with no other problem than the improvement and co-ordination of the medical services he would have been proud to have introduced it.

Mr. JOHNSTON, in moving the rejection of the bill said that it was with genuine regret that they saw in the measure the disappearance of a training ground for public administration in the form of the small burghs of Scotland. He hoped that it would be explained in Scotland that the Government were giving no relief for hospitals, but were giving relief for distilleries; that venereal disease would be free, but that maternity treatment would be charged for; and that if an old man who was treated for bronchitis could not pay, his son or daughter could be called on to pay, or, if they could not pay, then his grandson or granddaughter could be called on to pay.

Dr. DRUMMOND SHIELS seconded the rejection of the bill. He denied that the change from the percentage grant system to the block grant system was a step forward in regard to the public health services. He could not, he said, get away from the fact that the impulse for this change came from the Treasury, and not from any medical or local government source. Any saving to the Treasury in public health development meant heavier local burdens on depleted resources. That was one of the bad things in the bill, and even child welfare and maternity could not be saved from it. He was more hopeful about the hospital sections of the bill than any other part. The changes that had been made during the committee stage, although by no means all that they could have wished, had made some progress possible. The distinction between infectious and other diseases could not be justified, and they could only hope that the local authorities would use their discretion wisely in exercising their powers to enforce payment. Many of the people requiring treatment were already harassed by rent and other obligations; they needed more money when they were ill rather than to incur new penalities. He regretted especially in this connexion that the Government had not seen their way to exclude maternity hospitals. Presumably there would be paying and non-paying wards in the municipal hospitals, just as there were already in many voluntary hospitals. The voluntary hospitals had reluctantly agreed to the new arrangements, but some of their managers and supporters, and certain eminent members of the medical profession, had been voicing their fears of extinction by the municipal hospitals. No one would deny the splendid work which had been done, and was still being done, by the voluntary hospitals. If it was looked at rightly the new development was not a censure on voluntary hospitals, but was a real triumph for their educational work. They had convinced the community that medical and surgical aid must be promptly and fully available to every member of the population. The voluntary system, admittedly, could not achieve this, and the community, therefore, must accept the responsibility. For many years to come there would be need of all the resources of both voluntary and municipal hospitals, as there was a very big leeway to make up; and even if municipal general hospitals ultimately met a large part of the demand, there was still abundant pioneer work for voluntarism to do. The public conscience was still dull in regard to crippled children, for example, 75 per cent. of whom could be made self-supporting if they were treated earlier. Yet they were languishing in cripple hospitals and private homes throughout the country, a burden and an unhappiness to themselves, and very often a burden on the community. Mental defectives were still largely untouched by any kind of organization. Rheumatic children, who became very often permanent invalids, were, in many cases, without treatment of any kind or any opportunity of getting it. It was well known that the blind and deaf were also a class who had not yet received the attention which their condition and need merited. He hoped, therefore, that no dog-in-the-manger policy would attempt to hamper the new municipal and county efforts to do the barest duty to the community. There were difficulties in regard to the co-operation of the voluntary and municipal hospitals—in regard to staff, medical teaching, and many other matters—but they could be surmounted by a spirit of goodwill, which, he trusted, would be forthcoming.

Dr. ELLIOT, replying to the debate, pointed out that he had as much knowledge perhaps of hospitals and waiting-lists as almost any other member of the House. He had had the compiling of these waiting-lists. He had realized the hope deferred that made

the heart sick as week after week and month after month cases would come up asking for treatment when they knew that treatment would be an advantage, but owing to the shortage of accommodation they were forced to deny it. They were going a great way to remedy that in the proposals in the bill. The Mackenzie Committee reported that 700 beds of the first class could be made immediately available if agreement were reached between the municipal and Poor Law authorities and the voluntary hospitals, and that it would be possible to bring hundreds of beds immediately into service in Glasgow alone. In Aberdeen it had been possible to bring 160 beds into operation and keep them constantly filled. They could do that, and more, in the other cities under the hospital clause in the bill. The bill was read a third time by 269 votes to 86.

On March 12th the bill was introduced into the House of Lords and read a first time.

On March 19th, in the House of Lords, the EARL OF AIRLIE moved the second reading of the Local Government (Scotland) Bill. He said its principal purpose was the provision of adequate areas for carrying out the major local government services with a single controlling authority. EARL BEAUCHAMP moved the rejection of the bill, and expressed regret at the disappearance in so many cases of the *ad hoc* authorities. There would be a large increase in bureaucracy, and much of the splendid work done voluntarily in Scotland would disappear. Lord PARMOOR said that the bill, in respect of matters such as the recovery of expenses of the treatment of the sick, was a great improvement on the English bill. The MARQUESS OF SALISBURY said that if the tendency of the bill, as had been suggested during the debate, was to increase bureaucracy, he would profoundly regret it, and the Government would give consideration to amendments designed to prevent such a result. The bill had been accepted in the country as a great measure of reform. The motion for the rejection of the bill was defeated by 66 votes to 22, and the bill read a second time.

Research on Influenza.—Mr. A. M. SAMUEL, replying on March 12th to Mr. Malone, who asked if the Chancellor of the Exchequer would consider making a grant to the Medical Research Council or any other body for the purpose of research into the pathology of influenza, said that an inclusive grant in aid was made each year to the Council from the vote for scientific investigation. The Council had discretion to allocate any part of the grant to the purpose suggested by Mr. Malone if it should think fit. Mr. Malone asked if Mr. Samuel was not aware of the high death rate due to this malady in the last few months, and the apparent inability of the medical profession to deal with it. He asked whether the Government had not some responsibility to see that this research was carried out. Mr. Samuel replied that such a question specifically dealing with it should be addressed to the Minister of Health.

Notes in Brief.

Since January 1st, 1925, 58 slum clearance schemes have been confirmed by the Ministry of Health.

The Services.

OPERATIONS IN IRAQ.

THE name of Squadron Leader Hugh Leonard Burton, M.B., is among those brought to notice by Air Vice-Marshal Sir Edward L. Ellington, Air Officer Commanding British Forces in Iraq, for distinguished services rendered in connexion with the operations against the Akhwan in the Southern Desert, Iraq, during November, 1927–May, 1928.

ROYAL NAVY MEDICAL CLUB.

THE annual dinner of the Royal Navy Medical Club will take place this year at the Trocadero Restaurant, Piccadilly Circus, on Thursday, April 25th, at 7.30 for 8 p.m. Members who wish to be present are asked to inform the Honorary Secretary, Royal Navy Medical Club, Queen Anne's Chambers, Tothill Street, S.W.1, not later than seven clear days before that date.

DEATHS IN THE SERVICES.

Colonel William Frederick Ruttledge, R.A.M.C.(ret.), died at Farnborough on February 16th, aged 90. He was born on May 1st, 1838, and entered the army as assistant surgeon on March 31st, 1865. As a regimental officer he served in the 5th Foot, the Northumberland Fusiliers. He became surgeon major after twelve years' service, and retired, with an honorary step as brigade surgeon, on April 29th, 1885. After retirement he was employed in the Military Prison Department at Aldershot, and was given the honorary rank of colonel on October 18th, 1902, for services in England during the South African war. He served in the Afghan war of 1878–80, receiving a medal.

Major Charles James Addison, R.A.M.C.(ret.), died of pneumonia in London on February 21st, aged 74. He was born at Wyke Regis, Weymouth, on March 17th, 1854, educated at St. Thomas's and in the Edinburgh Extramural School, and took the L.R.C.P. and S.Ed. and the L.S.A. in 1880. He entered the army as surgeon on February 5th, 1881, became surgeon major after twelve years' service, and retired with a gratuity on November 28th, 1900. He served in the Egyptian war of 1882 (medal and Khedive's bronze star); in the Tirah campaign on the north-west frontier of India in 1897–98 (medal with three clasps); in the South African war in 1899–1900 (medal and clasp); and in the recent great war of 1914–18 (General Service Medal and Mercantile Marine Medal).

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

AT a congregation held on March 9th the degree of Sc.D. was conferred on Edward Hindle, M.A., Ph.D., Beit Memorial Research Fellow in Tropical Medicine, formerly Professor of Biology in the School of Medicine, Cairo.

UNIVERSITY OF LONDON.

PARLIAMENTARY REPRESENTATION.

SOME members of the executive of the University of London Conservative and Unionist Association, including Sir Philip Magnus, Dr. Sidney Phillips, and Professor W. E. Dixon, M.D., have intimated their intention of supporting the re-election of the sitting member, Dr. E. Graham Little (Independent Conservative).

UNIVERSITY OF DUBLIN.

TRINITY COLLEGE.

AT the spring commencements, Hilary term, held on March 16th, the following degrees and licences were conferred:

LICENCE IN MEDICINE, SURGERY, AND OBSTETRICS.—H. Dundon.
M.B., B.CH., B.A.O.—N. Burstein, J. E. C. Cherry, F. R. Falkiner, E. C. Hicks, C. King, N. Shapira.
M.D.—T. J. Kelly.

NATIONAL UNIVERSITY OF IRELAND.

THE Senate, at its meeting on March 15th, recorded its deep regret at the death of Sir Bertram C. A. Windle, who, as Vice-Chancellor of the University and its representative on the General Medical Council and other public bodies, rendered invaluable and unfailing service to the advancement of the University, and expressed its sincere sympathy with Lady Windle and other members of the family in their bereavement. The Senate also adopted a resolution deploring the loss sustained by the death of Dr. Andrew R. J. Dungan, lecturer in medical jurisprudence, University College, Dublin, and tendered its sympathy with the relatives.

Professor David T. Barry, M.D., has been appointed one of the representatives of the University at the seventh centenary celebrations of the University of Toulouse in June next, and Professor W. D. O'Kelly, M.D., will represent the University at the Royal Sanitary Institute Congress to be held in Sheffield in July.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary Council meeting was held on March 14th, when the President, Sir Berkeley Moynihan, Bt., was in the chair. The Council offered its congratulations to the President on his elevation to the peerage.

The Diploma of Fellowship was granted to Ian Douglas Miller and the Diploma of Membership to W. F. Skaife, these candidates having complied with the regulations.

The following diplomas were conferred jointly with the Royal College of Physicians:

TROPICAL MEDICINE AND HYGIENE.—K. P. Anklesaria, F. C. K. Austin, T. C. Backhouse, R. Bandyopadhyay, S. Batchelor, P. S. Bell, D. D. Bhargava, W. K. Blackie, J. S. Brown, J. Bryant, J. A. Carman, Irene E. Chandler, A. D. Charters, L. S. Chatterji, N. Chilton, H. L. Chopra, J. C. Chukerbutti, N. E. Cook, M. Das, P. T. J. Doss, A. N. Duggal, D. P. Dutta, J. G. Green, H. E. Hargreaves, E. Haworth, R. S. F. Hennessey, H. Joomye, N. Kamchorn, Y. M. Khan, C. E. M. J. Libert, G. A. Messih, G. W. Milledge, W. S. Nealor, S. L. Rikhye, S. F. Russell, E. H. Stahly, R. Stanford, Eileen M. Turner, G. G. Udeshi, Alice E. S. Wharton, J. B. A. Wigmore, A. J. W. Wilkins, Cecily D. Williams, and D. B. Wilson.

OPHTHALMIC MEDICINE AND SURGERY.—S. Annaswami, Y. P. Ledi, G. R. Bhatia, M. D. Bower, G. A. Bradshaw, C. S. Colvin, H. V. Coverdale, H. N. Dewan, Jean M. Dollar, J. B. Dhaubhoora, E. H. W. Elkington, W. D. Hamilton, M. Husnain, Audrey H. Henson, S. J. A. Laubscher, A. A. El M. Magraby, Sigrid L. S. Pearson, F. E. Preston, Gertrude E. Pugmire, B. W. Rycroft, A. E. M. Soliman, A. D. C. Stoute, Annie V. Taylor, Marjorie P. Taylor, G. Vaishnavi.

Licences in dental surgery were granted to 31 candidates.

The President presented to the College a copy of a portrait of Ambroise Paré in the museum at Fécamp in Normandy, thought to be the work either of Mirvelt or Heufchatel.

It was decided to offer to hold a reception at the College in the evening of Tuesday, May 7th, for members attending the fifth International Congress of Military Medicine and Pharmacy.

The Secretary reported that the application for a licence from the Board of Trade for a British College of Obstetricians and Gynaecologists would be heard by the Board on March 22nd, and that the Royal College of Physicians of London and the Royal College of Surgeons of England would be represented by counsel in opposing the application.

Obituary.

WILLIAM WRANGHAM, M.D., M.R.C.P.,

Senior Physician, Royal Infirmary, Bradford.

ON March 16th Dr. William Wrangham, one of the best-known consultants in Bradford, died with startling suddenness from angina pectoris.

Son of the late Dr. Wrangham, William Wrangham was born in 1871 in Lincoln, where his family had lived for many generations, several members of each generation belonging to the medical profession. Having received his medical education at St. Bartholomew's Hospital he qualified M.R.C.S., L.R.C.P. in 1896, graduating M.B. in the same year, and proceeding M.D.Lond. in 1900. During the three years immediately following his qualification he held various resident appointments, and in 1900 he settled in general practice in Bradford, where shortly afterwards he was appointed chief police surgeon, assistant honorary physician to the Bradford Royal Infirmary, and assistant surgeon to the Bradford Royal Eye and Ear Hospital; at the time of his death he was senior honorary physician to the Bradford Royal Infirmary. In 1915, when St. Luke's Hospital was equipped as a war hospital, William Wrangham was placed in charge, with the rank of lieutenant-colonel. In this capacity he served until the hospital was handed back to the civil authorities in 1919, receiving in recognition of his services the Order of the British Empire, and letters of congratulation from the general commanding the Northern Division and Sir Berkeley Moynihan. When, in the following year, St. Luke's Hospital was taken over by the municipality, he was appointed senior honorary physician, and, relinquishing general practice, devoted himself entirely to consulting work, in which he was engaged up to the time of his death. In 1924, when the British Medical Association held its Annual Meeting in Bradford, he was honorary secretary of the Section of Medicine, and in the period 1927–28 he was chairman of the Bradford Division.

William Wrangham was not only a skilful physician, sound in diagnosis and prognosis, and resourceful in treatment, but a man of the highest probity, who was universally honoured by his medical colleagues and the many citizens of Bradford with whom his appointments brought him in contact. He is survived by his wife and two daughters, to whom and to his brother, Dr. J. M. Wrangham of Ripponden, we extend deepest sympathy.

WE regret to announce the death, on March 16th, after a brief illness, of Dr. WALTER JAGGER, one of the leading practitioners in the West End of London. He was born in 1871, and went from Shrewsbury School to study medicine at Edinburgh, graduating M.B., C.M. in 1896. He served in the R.A.M.C. throughout the South African war, and received the Queen's medal with four clasps and the King's medal with two clasps. After leaving the army he practised first in Lincoln, then at Bourne End, Bucks, and for the past fifteen years in London, where he held a number of clinical appointments. During the late war he was on the staff of Princess Christian's Hospital for Officers, and the R.A.F. Hospitals for Officers in Eaton Square and Bryanston Square. With Sir Henry Simson he attended H.R.H. the Duchess of York at the birth of Princess Elizabeth, and he was also in attendance on the Duchess during her recent attack of influenza. Sir Henry Simson writes: Memories going back to the time when we were students together in Edinburgh crowd in upon one when one thinks of Walter Jagger: his happy greetings, his quaint humour, and his old-fashioned courtesy and precision of manner. Nothing was too trifling in order that the thing to be done should be done properly. Whether in the lecture room, at the Students' Union, on the golf course, it was the same—something to be done, a proper way to do it, and always a happy faculty of seeing the humorous side of a situation. I have a suspicion that his service with the R.A.M.C. in South Africa was one of the happiest times of his life. It certainly left its impression on his character in after-life; but he never talked much about it, and it was not until years later, when he came to London, that we renewed the friendship begun in Edinburgh. We were associated very closely as secretaries of the Edinburgh University Club of London, and he gained a considerable reputation for making after-dinner speeches at the club dinners. His friendship was not given easily, but once gained he never let you down.

DR. ELSIE THOMSON, who died at Kew on March 6th, was the younger daughter of Dr. T. C. Thomson, lately of the Colonial Medical Service at Hong-Kong. She was educated at St. George's School, Edinburgh, and after qualifying as a nurse at the Royal Infirmary, she graduated M.B., Ch.B.Ed. in 1923. Four years later she obtained the D.P.H. She was for some time resident medical officer at the Mothers' Hospital, Clapton, and later gained experience in public health work at Ilford, and under the London and Staffordshire county councils. In 1925 she was appointed assistant medical officer in charge of maternity and child welfare for the borough of East Ham, and retained this post until her death at the untimely age of 37. Elsie Thomson possessed qualities of mind and character that endeared her to all those who knew her. The following is quoted from an appreciation by Dr. Benton, medical officer of health for East Ham: "With the passing of Dr. Elsie Thomson the Public Health Department of East Ham has lost a loyal colleague, and the East Ham Corporation one of their most capable and valued officers. Her sweet personality and patient sympathy with those in difficulties won complete confidence. This has been many times emphasized lately by repeated inquiries from numerous mothers regarding the doctor's health and return to work." The mayor of East Ham attended the funeral at Richmond in his official capacity, accompanied by several representatives of the public health life of the borough.

The following well-known foreign medical men have recently died: Dr. MARCEL LERMOYEZ, an eminent Paris laryngologist, member of the Académie de Médecine, and one of the founders of the *Presse Médicale*, aged 70; Dr. FRÉBAULT, honorary professor of toxicology in the Toulouse faculty of medicine; Dr. RAPHAEL DUBOIS, honorary professor of physiology in the Lyons faculty of medicine; Professor GHERARDO FERRERI, director of the oto-rhino-laryngological clinic of Rome; Professor ALDO PERRONCITO, director of the institute of general pathology at Pavia; and Professor FILIPPO SPECIALE CIRINCIONE, director of the ophthalmological clinic at Turin.

Professor H. R. Kenwood writes: There are many readers of the *British Medical Journal* who will feel a keen sense of regret and of loss on hearing of the recent death of Mr. F. T. MARCHANT at the early age of 49. For thirty-five years he was a highly valued associate of mine in the Public Health Department of University College, London, where he came in contact with a very large number of medical men and women during their training for the D.P.H. He began his work at the College, at the age of 14, as a laboratory attendant; when he ended it he was a member of the College staff, a demonstrator and lecturer of rare ability, and the joint author of a textbook upon hygiene and public health (Jameson and Marchant). He acquired such a good knowledge and technique, both of public health chemistry and bacteriology, and he possessed such a wonderful power of informing and training others, that his services became invaluable. Indeed, his death will deprive the new London School of Hygiene (to the staff of which he had been elected) of one whose special experience and knowledge it will be difficult to replace. His great gifts won for him the esteem, and his good personal qualities the affection, of those who worked with him. Always kindly and sympathetic to those in difficulties, he was almost prodigal with the time and trouble he would devote to assisting them. This generous trait, and his modest, kindly, and unselfish disposition, will be held in tender remembrance by all his associates and by very many who are now medical officials in the public health services of Great Britain and her Dominions. Marchant was a man of poor physique, but the indifferent health by which he was so often handicapped levied little toll of his mental energy. He made time for some useful items of research, and in his leisure he was a great reader and student to the end. He was "a home bird"—a fact which will not surprise anyone who knew something of his home life, for it was a very attractive home, if only from the standpoint of the great comradeship and devotion of the two who shared it; and our deepest sympathy will go out to Mrs. Marchant in her bereavement. There was no child of the marriage.

Medical News.

MR. CHARLES HERBERT HAMPSHIRE, M.B., B.S., B.Sc., F.I.C., has been appointed by the General Medical Council to be the secretary of the Pharmacopoeia Commission. He will take up his duties from June 1st. All communications intended for the Pharmacopoeia Commission should be addressed to the secretary of that body at 44, Hallam Street, Portland Place, W.1, and not to any individual.

A SPECIAL discussion on encephalomyelitis of man and animals will take place at a joint meeting of the Sections of Comparative Medicine and of Neurology of the Royal Society of Medicine on Wednesday next, March 27th, at 5 p.m. Mr. I. A. Galloway will open the discussion on behalf of comparative medicine, and Dr. J. G. Greenfield for neurology.

A COMPLIMENTARY dinner to the honorary medical board of the institution will be given by the Trustees of Lord Mayor Treloar Cripples' Hospital and College on Friday, April 5th, at Barbers' Hall.

THE Fellowship of Medicine announces that the first course in April will begin on the 8th; it will be a practitioners' course in medicine and surgery at the London Temperance Hospital, from 4 to 5.30 p.m. daily, lasting for two weeks. The London School of Tropical Medicine will give a series of eight clinical demonstrations on Tuesdays and Thursdays, at 2 p.m., from April 9th to May 2nd. There will be a course on treatment by electrotherapy at the Royal Free Hospital on four successive Wednesdays, at 5.15 p.m., beginning May 10th, and limited to sixteen. Two courses will begin on April 15th. The first is a three weeks' course at the Royal Waterloo Hospital in medicine, surgery, and gynaecology, occupying every afternoon and some mornings; the second course is in neurology at the West End Hospital for Nervous Diseases, each afternoon at 5, and lasting for four weeks, with a minimum entry of ten. Syllabuses of these courses, with information about post-graduate work in London and the provinces, copies of the general course programme, and the *Post-Graduate Medical Journal*, can be obtained on application to the Secretary of the Fellowship, 1, Wimpole Street, W.1.

THE annual general meeting of the Cremation Society of England will be held in the council chamber at 23, Nottingham Place, W.1, on Wednesday next, March 27th, at 3.30 p.m., when the council's report and balance sheet for the year 1928 will be submitted.

THE house and library of the Royal Society of Medicine will be closed from Thursday, March 28th, to Tuesday, April 2nd, both days inclusive.

SIR STCLAIR THOMSON has been elected "correspondant étranger de l'Académie de Médecine"; Professor J. H. Abt of Chicago, an honorary member of the German Society of Children's Diseases; Dr. René Gaultier, president for 1929, and Professor Hayashi, dean of the medical faculty of Tokio, an honorary member of the Société de Thérapeutique of Paris; and Dr. Henry Coppez, president of the annual medical congress known as the Journées Médicales de Bruxelles, which will be held in Brussels in 1929.

AMONG the newly elected Fellows of the Royal Society of Edinburgh are the following members of the medical profession: Dr. E. W. H. Cruickshank of the Physiology Department, Dalhousie University, Halifax, Nova Scotia; Mr. Walter Mercer, lecturer on Clinical Surgery in the University of Edinburgh; and Dr. Sydney A. Smith, Regius Professor of Forensic Medicine, University of Edinburgh.

MR. L. F. HEWITT, Ph.D., B.Sc., has been appointed biochemist at the Metropolitan Asylums Board's antitoxin establishment, Belmont Laboratories, Sutton. Dr. Hewitt is at present Gibbons Research Fellow at the London Hospital, and was formerly Freedom Research Fellow at the London Hospital, and research chemist, under the Medical Research Council, at Mount Vernon, Hampstead.

THE Gifford Edmonds prize in ophthalmology has been awarded to Mr. V. M. Métivier of the Ophthalmic Department of Edinburgh Royal Infirmary, for his essay on the causation and differential diagnosis of proptosis. This prize, founded by Miss Sophie Edmonds in memory of her brother who fell at Magersfontein, is valued at £100, and is awarded every second year.

THE Lord Mayor, accompanied by the Lady Mayoress and the Sheriffs, attended the annual meeting of St. Mark's Hospital on March 15th, illustrating the special patronage by the City of London which the hospital has enjoyed during its ninety-three years of existence. The recent increase in the number of beds at this institution has called for further extensions, including additional accommodation for nurses, a second operating theatre, and expansion of the cancer research laboratories; the cost entailed is about £30,000.

INFORMATION has just been received that the American Medical Association has joined the Association Professionnelle Internationale des Médecins (A.P.I.M.). Other recently joined members are the Medical Associations of Greece and of Palestine.

A PAPER by Messrs. J. Evans and A. O. Jones, on the determination of alcohol in urine, which was read at a meeting of the Society of Public Analysts on December 5th, and mentioned briefly in our issue of December 22nd, 1928 (p. 1140), has now been published in the March issue of *The Analyst*.

THE thirty-third post-graduate course of the Vienna Medical Faculty will be held from June 3rd to 15th, the first four days being devoted to surgery. On June 7th and 8th there will be lectures and demonstrations in orthopaedics, and on the 10th and 11th in neurology; the remaining days will be occupied by gynaecology and obstetrics. Further information may be obtained from the office of the Vienna Medical Faculty, Schlösselgasse 22, Vienna VIII.

THE forty-second congress of the Société française d'ophtalmologie will be held on May 13th, when Dr. Aubaret will read a paper on the etiology and treatment of blepharitis. Further information can be obtained from the general secretary, Dr. R. Onfray, 6, Rue de la Motte Picquet, Paris VII^e.

THE Droitwich Development Corporation, Ltd., has now acquired ownership of this town, including the High Street, the three principal hotels, the two existing brine baths, the park, golf links, and many miles of existing roads. The proposals for extension include the erection of a new spa at the cost of £250,000 with one of the largest covered baths in the country, and a building containing more than 100 private baths. A new theatre, concert hall, club, and cinema are also to be constructed, and it is intended that the Droitwich season shall eventually continue throughout the year.

WE have received the first issue of a journal entitled *Rivista di Radiologia e fisica medica*, which is to be published every two months at Bologna under the editorship of Professor G. C. Palmieri and an international editorial committee. Articles will be published not only in Italian, but also in English, French, and German.

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the *British Medical Journal* are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

The ***TELEGRAPHIC ADDRESSES*** are:
EDITOR of the *British Medical Journal, Aitiology Westcent, London.*
FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*
MEDICAL SECRETARY, *Mediscra Westcent, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 62550 Dublin), and of the Scottish Office, 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone 24361 Edinburgh).

QUERIES AND ANSWERS.

HARVEY AND HERVEY.

"W. H. C." writes: Re-reading Sir Thomas Barlow's Harveian Oration of 1916, printed in the *Journal* for October 28th of that year, I note that he refers to Abraham Cowley's poems, saying "his two poems on Harvey." Has he not confused the poem to William Hervey as one of the two he mentions, the other being the well-known Ode to William Harvey, the real subject of the Oration?

THE TRIANGULAR BANDAGE.

"INQUIRER" writes from New Zealand: I should be glad if any of your readers could enlighten me regarding the origin of the triangular bandage, so extensively used in first aid. I should like to know when and by whom it was introduced.

TREATMENT OF PREMATURE BALDNESS.

DR. M. BROWN (Glasgow) asks for suggestions for treating a nervous lad, aged 18, who is prematurely bald, and is becoming very sensitive about his appearance. There is a mild degree of sexual neurasthenia, but otherwise he is normal. Would glandular therapy help?

PROLONGED ADMINISTRATION OF CASCARA.

"SIGMOID" asks: (1) Can cascara sagrada be administered for long periods without producing deleterious effects? (2) Can the drug produce poisonous symptoms when administered for long periods, and what form will these symptoms take?

ADMINISTRATION OF ULTRA-VIOLET RAYS.

DR. ELIZABETH C. MUDIE (Glasgow), in reply to "A. M." (March 9th, p. 485), writes: (1) and (2) The best way of heating small treatment rooms is by electric radiators. A two-unit fire will keep a room 15 ft. by 15 ft. at 70° F., but in addition I advocate the use of a Sollux lamp, which can be placed over the patient to prevent chill while he is undressing. A temperature of 70° F. will not harm the lamp. (3) A steam radiator should not be used in the treatment room, as moisture in the atmosphere shuts off short ultra-violet rays. (4) It is advisable to have the lamp reconditioned at the end of twelve months, but there are instruments on the market for recording the efficiency of the burner.

ENURESIS.

DR. F. R. PROCTOR-SIMS (London, N.) writes: In reply to "K.'s" query (March 9th, p. 485), I should advise him to try suggestion. I had a case some years ago of a bright, intelligent boy about 10 years of age, who was brought to me by his father for nocturnal incontinence of urine. I spoke to the boy quietly about the drawbacks in life that the habit would be to him, and especially how it would debar him from staying at friends' houses during his holidays. I gave the father instructions about not giving the boy anything to drink close to bedtime, and to see that the boy emptied his bladder before retiring. I told the boy himself that I was giving him some medicine which would wake him up in the night if his bladder got full, and that he was immediately to jump out of bed and micturate. The mixture was a simple bitter tonic. The father called on me a week afterwards and said that there had been no trouble since, and as I have seen neither of them since, I presume it was a cure. I know of one other case which was cured by hypnotic suggestion. With regard to belladonna—if this has to be tried—I wonder if "K." has used the extract belladonna virid 1/10 grain in water t.d.s. I found it in some cases more effective than the tincture.

"L," in reply to the query of "K." on March 9th (p. 485), reports a case in a boy, aged 10, a relative-in-law of his own, who was staying with him as a guest for two months last summer holidays. Treatment consisted in orders that the boy was himself to perform all the tidying-up, washing, and drying involved by his disability, and that preliminary instruction by the women folk, and a certain amount of watching, were all that they were to do for him. The sense of shame and horror he evinced on the first morning gave an idea of the difficulty such orders would meet with in the case of a boy at home in the care of a mother habituated to do everything for him. Undeterred by reports of relapse after dramatic initial success, "L." persisted, and saw to it that no evasion of his orders was practised by anyone. At Christmas the mother gratefully wrote reporting that the resulting improvement had been well maintained. The life of an uncle of this boy had been practically wrecked by enuresis.

TREATMENT OF CHRONIC CONSTIPATION.

DR. ARTHUR E. DRUITT (Southampton) writes: Dr. Rothwell's inquiry in the *British Medical Journal* of March 9th (p. 485) prompts me to reply that I am always surprised at the frequent resort to drugs in chronic constipation without any mention of diet, in view of the uselessness of relying on drugs for an ailment which, in perhaps nine cases out of ten, is brought about by irregular habits and indiscretion in diet. When shall we learn that the wrongness of feeding on white bread can only be properly rectified by changing over to wholemeal? How is it that methods such as regular feeding, rational dietary, the adequate use of water, and the inclusion of sufficient vegetable roughage are not more practised? If, in spite of such reasonable care, the malady still persists, why, instead of falling back on drugs, should not restoration of muscular activity be sought in massage, hydrotherapy, and electrical treatment, combined with physical exercises? In emergencies cathartics hold a valuable place, but chronic constipation is not an emergency, though it is the frequent precursor of such. Unless there is reason to resort to the more specialized forms of treatment, my general practice is to recommend the use of uncooked bran, one tablespoonful for an adult or a teaspoonful for a small child; this is mixed into the breakfast porridge at the time of serving out. It lends itself well to this, and can also be mixed in milk, marmalade, etc., according to taste. It is placed, when needed, upon the table as regularly as is the sugar basin, so that people may help themselves without further comment, and carry on the treatment, if necessary, for the rest of their lives, taking it with them when on holiday. It is a treasure indeed to those who have common sense enough to use it, and who do not mind not being in the fashion of using a special doctor's prescription or the latest preparation of liquid paraffin. The construction of our w.c.'s is, in my opinion, very wrong, inasmuch as it does not encourage the natural attitude for defaecation, and herein lies, aided by natural laziness, a great contributory factor to constipation. When in Damascus, shortly after the war, I was delighted to note in the best houses a simple hole in a stone slab on the floor, through which water constantly trickled, as it was supplied by the fountain in the centre of the dwelling. The natural squatting position was then the only one to adopt, but happily for those who are thus minded and physically inclined, our own w.c.'s can, by a little ingenuity, be likewise utilized.

INCOME TAX.

Assistant—Free Accommodation.

"A. H. W." is at present remunerated by a salary, out of which he pays for his own board and lodging. It is suggested that he should take over his principal's present house, free of rent and lighting charges, and receive a smaller cash remuneration. If he does will he be assessable on the cash only, while his principal deducts the full cost to himself?

*** In our opinion, Yes; provided that the new terms of appointment make it clear that "A. H. W." will have no legal tenancy of the house and no right to sublet any portion of it.

Assistant's Expenses: Professional Subscriptions.

"J. S." is employed as an assistant to a general practitioner. The local inspector of taxes has refused to allow the deduction from the amount of the salary of the subscription to the British Medical Association, Medical Defence Union, etc., on the ground that, as the employer is responsible, those expenses are not "necessarily" incurred by the assistant.

*** The point is whether the expenses are "necessarily incurred" to earn the salary in all the circumstances. If the principal leaves it to the wish of his assistant as to whether he or she joins certain associations, etc., then the subscriptions are not "necessary," however proper and desirable. But if the principal lays it down as a condition of employment that his assistant shall belong to those associations—as he very well may—then the assistant must incur the annual expense of subscriptions, and that expense is necessarily incurred in the performance of the duties, as required by the terms of employment. We have always understood that the above statement of the position is accepted generally by inspectors of taxes.

LETTERS, NOTES, ETC.

PROPHYLAXIS OF INFLUENZA.

DR. E. R. LYTH (Isle of Man) writes: Influenza has been my *bête noire* for many years and, in spite of inoculations and sprays, I have succumbed over and over and over again. Comparatively recently I hit upon the idea of spraying or atomizing my nose and throat with an infusion of tea, and I have found this most helpful; though attending cases of influenza, it has been a new experience to escape and to keep well. There is no pain whatever in the use of the spray, and the tea mixes readily with the nasal mucus. I put in fresh tea from the breakfast teapot each morning after washing out the bottle, and this serves for the next twenty-four hours, being used, indifferently, hot or cold. Two or three compressions of the bulb for each nostril and for the throat before going out and on returning has been my custom, with an extra use of the atomizer before and after seeing any suspicious case.

ENDOGENOUS OR EXOGENOUS.

DR. F. P. DE CAUX (London, W.) writes: Sir James Barr, writing in your issue of March 9th (p. 475), stated that, after douching his nose with saline, a few drops of clear fluid would drop out on lowering his head. It may interest him to know that I douche my nose regularly with glycerinum thymol compositum (*B.P.C.*), and that on lowering my head several drops of pink-coloured fluid run out, and that, if I do not lower my head until several hours have elapsed, when I do so the pink fluid still runs out. If Sir James were to colour his saline with a solution of carmine he might think of another reason than the one he gives.

UNUSUAL SYMPTOMS OF PROSTATE ENLARGEMENT.

"J. C." writes: I was interested to see in the *Journal* of February 9th (p. 233) that when one of Mr. Grey Turner's patients put his hands into water he experienced an instant urge to micturate. I have spoken to surgeons about the reflex connexion between the bladder and hands, but have never obtained any satisfaction. In my own experience when the bladder is over-distended there is acute pain in both palms on starting urination. I wonder if Mr. Grey Turner has noted mental changes in the direction of *tête montée* in early cases of prostate enlargement?

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 47, 48, 49, 52, 53, and 54 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 50 and 51.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 71.

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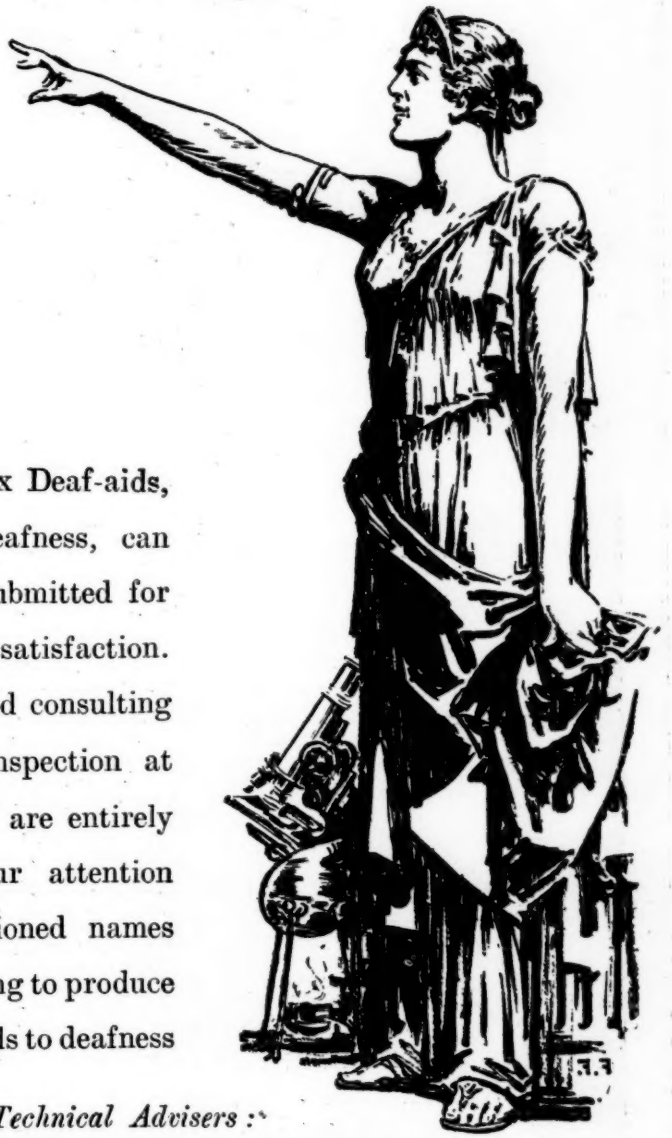

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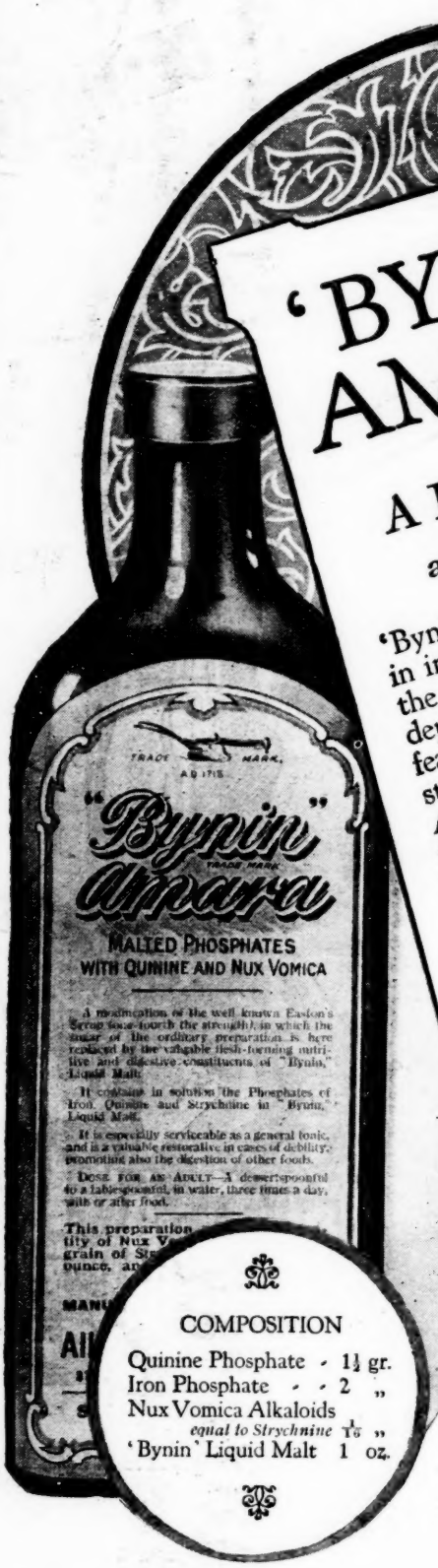

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Printed and published by the British Medical Association, at their Office, Tavistock Square, in the Parish of St. Pancras, in the County of London